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ABSTRACT

This study reports the results of an evaluation of the operational feasibility of a new model for training personnel for educational research and development. Also, recommendations are made for future testing of the concept on a larger scale. The evaluation attempts to identify practical aspects of the pilot program which could be modified, maintained, or improved. A total of 14 key questions were investigated in such areas as achievement by apprentices, apprentice reaction to the program experience, the host institution's reactions, the degree to which the training program and experience could be exported, and suggestions for other types of models. Although a number of model modifications were recommended, it is concluded that the pilot training program was successful and effective. In addition, it is felt that variations of the model developed can be of use in independent training programs as an adjunct to regular academic programs or for inservice training. The inservice model is recommended as the most immediately viable for educational research and development training efforts. (Author)

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FINAL REPORT

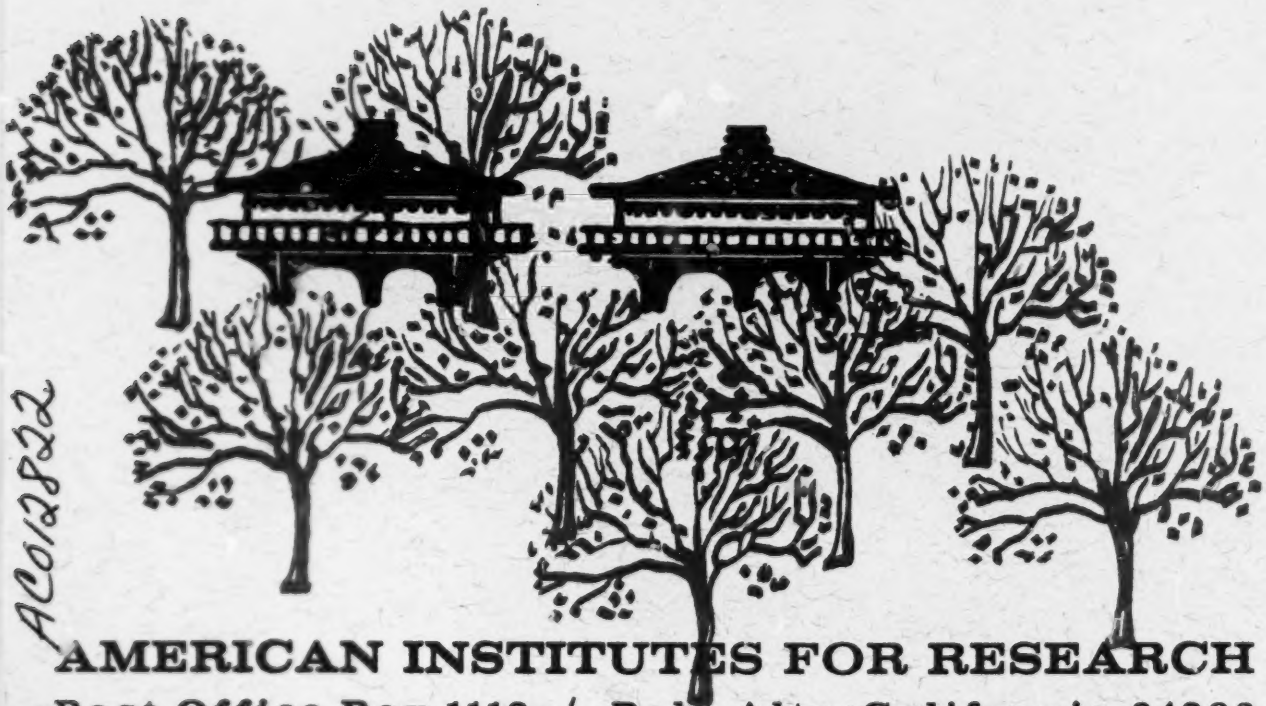
Project No. 1-0698
Grant No. OEG-0-71-4711

Judith M. Melnotte
Eugene J. Millstein
James A. Dunn

A STUDY OF THE OPERATIONAL FEASIBILITY OF THE APPRENTICESHIP WORK-STUDY PROGRAM FOR MULTI-SITE TRYOUT AND EVALUATION

March 1972

U.S. Department of Health, Education, and Welfare
Office of Education
National Center for Educational Research and Development



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Post Office Box 1113 / Palo Alto, California 94302

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James A. Dunn - Principal Investigator
Judith M. Melnotte - Project Director
Eugene J. Millstein - Director of Training

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Judith M. Melnotte
Eugene J. Millstein
James A. Dunn
American Institutes for Research
P.O. Box 1113
Palo Alto, California 94302

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U.S. Department of
Health, Education, and Welfare

Office of Education
National Center for Educational Research and Development

ABSTRACT

The goal of this project is to evaluate the operational feasibility of a new model for training personnel for educational research and development, with recommendations for future testing of the concept on a larger scale. The focus of the evaluation is to identify practical aspects of the pilot program which could be modified, maintained, or improved, as well as recommend new directions for future efforts.

Fourteen key questions were investigated. They included achievement by the apprentices, apprentice reaction to the program experience, the reactions of the host institution, the degree to which the training program and experience could be exported, and suggestions for other types of models.

While a number of modifications of this model were recommended, the pilot training program is considered successful and effective. In addition, variations of the model developed can be of use in independent training programs, as an adjunct to regular academic programs, or for in-service training. The in-service model is recommended as the most immediately viable for educational research and development training efforts.

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CHAPTER 1

INTRODUCTION

Background Discussion

A decade or so ago educational research and development were carried out mainly in graduate schools. The main theme was basic research. This basic research was conducted by dedicated scholars working individually. They drew on students who became their assistants. Much of what these assistants learned about research and development, they learned from their mentors. As these efforts grew in scale and became more formalized, graduate courses and programs slowly evolved. The advent of federal support to formal training programs and the needs of the burgeoning educational R&D industry in laboratories and centers hastened this evolution.

Today, however, the field of educational research and development has become considerably broader than the basic research of decades past. The skills are different, the settings have shifted from the academic mold of the university to the worlds of production, dissemination, and practical impact. There is no doubt a melding of pragmatic and theoretical/academic activities, but there has been little formalization of programs to serve both masters at once. The gap has been recognized, and we again observe the need for apprentices. The more traditional training institutions cannot fully meet that need. Since the bulk of educational research and development is shifting away from the university, the university is no longer the only viable training ground. The "action" is moving to the marketplace, much of the learning is by "doing," and many of the exportable ideas for education come from agencies whose very existence depends on addressing problems with practicality and impact. Basic research knowledge is still necessary, but no longer sufficient. There is a new ethic of accountability that traditional programs have rarely faced.

Strangely enough, the old paradigm of the mentor/apprentice reappears in an informal way at Educational Laboratories, R&D Centers, and at private research agencies. The "mentors" teach their "apprentices" (junior staff), albeit in an informal way. It would seem logical that if the field of educational research and development requires the varied expertise of academic background combined with practical application, training should be designed to accommodate both. There is no better way to satisfy the desirability of applied efforts in training, given an academic base, than to participate in an on-going, established, accountability-oriented activity. Most university graduate programs cannot, or do not, satisfy this need.

Educational research is a much broader world of work than ever before. It has come a long way from writing a workbook, or studying a single facet of

learning, writing it up, and publishing it in a journal. In turn, professional educators currently employed in educational R&D are no longer involved in only pure educational research as in years past. There is now a much greater emphasis on development, dissemination, and impact. The real world of educational research and development requires some knowledge of such diverse topics as finance and budgeting, day-to-day production engineering and monitoring, economics and sources of support, vehicles for dissemination, marketing, long-range planning, manpower needs identification, communications, and presentation techniques. These are the real life facets of current educational research and development, and an apprenticeship would serve as the vehicle by which an individual could become acquainted with such realities.

Schools, as they traditionally exist, do not provide many of these experiences. It is unrealistic to set up traditional training programs for the "Renaissance Man" in educational R&D. The basic goal then becomes the means by which the most realistic, efficient, and effective exposure to the field is provided. Apprenticeships currently provide the most realistic approach to fulfilling this need. The apprenticeship notion is extremely logical and flexible. With the current need for diversity in manpower, and the current absence of reality-based programs to meet those diverse needs, the development of various approaches to training educational research and development personnel becomes a critical task.

Perspectives for the 70's

Obviously, reality-based activities take place in agencies and institutions which are actually involved in educational research and development. A major consideration, however, is not so much where reality-based activities should take place, but rather, how and by whom these facilities might be used.

There are three major categories of persons who might participate in a reality-based (or apprenticeship) experience in educational research and development. First, there are those persons who have considerable work experience, even in research and development, but who have had no experience in educational research and development. Educational R&D facilities might be used to provide entry training to those already possessing basic R&D skills, with an eye toward re-directing those skills and experiences to the field of education. This is defined as "cross-training," and serves as the basic description for the AIR training model being evaluated in this study.

A second category of persons would include those who are university undergraduate or graduate students in educational research. Traditionally, R&D facilities have been used to supplement this formal academic training in basic educational theory or educational research. In many instances, universities attempt to provide their own "reality-based" programs, often labeled "internships." These internships may be internal or external to the university. There are a variety of disadvantages, however, to university-based internship programs which are discussed more fully in Chapter 4. Prime among these disadvantages, though, is that the scope of experiences necessary for a realistic, work-oriented program is quite restricted in most instances. Most universities simply do not have access to the scope of project resources necessary to an effective internship or apprenticeship, nor can they effectively engineer realistic work experiences when those experiences must be correlated with the academic calendar.

The third category of persons who might be trained in an apprenticeship type program includes those who are already employed in educational research and development, but who wish to develop their skills further. With this population, the main purpose of an apprenticeship would be intensive, specific, in-service skill development, rather than broad, entry-level training in educational R&D, as in the first two cases.

All three of these types of populations need to be considered in light of current and projected manpower needs in educational R&D. To cross-train or supplement traditional academic training (which includes the first two categories of persons), implies a new influx of manpower. These are persons who are not new in the field, but who could become so after an apprenticeship experience. In view of the immediate prospects in educational R&D employment, this problem is probably not as great now as it was only two or three years ago.

The third category of potential apprentices includes those who are already in the field of educational R&D. There would be no new influx of manpower, but rather an upgrading of existing manpower. In this latter case, the main issue is that of improving the existing skill repertoire, rather than creating a repertoire.

In view of the likelihood of the creation of large scale institutional development in the form of NIE, and in view of the long range stability of Educational Laboratories, Centers, and non-profit institutions such as AIR, and ETS, this latter category is likely to be the most important of the three, at least in the immediately foreseeable future.

It is indeed, a very strong point for discussion as to whether "new bodies" or "better bodies" are needed in educational R&D today. As recently as a year or two ago, a small number of studies indicated that there would be personnel shortages in the years to come. These estimated shortages ranged from severe to modest. It may well be that current economic setbacks and spotty commitments to educational R&D make the more severe predicted shortages

somewhat suspect. However, the more conservative estimates are still no doubt viable, even given an uncertain outlook for educational R&D. There will be manpower needs, but all would agree that the short-range demand is in a period of slack.

What then for the immediate future? Apprenticeships are acknowledged to be desirable and necessary to the field, but the current issue is to whom those apprenticeships might be directed. In the case of cross-training, we have an influx of new manpower from other disciplines, most notably the physical sciences. As regards models for training housed in universities, there is no doubt that existing R&D facilities can benefit such programs.

But, the immediate future calls for a need to make educational R&D workers better, not just simply to make more of them. These are times of accountability, and "tight money." Educational R&D then, needs to make the best of what it already has on hand. This is not to say that apprenticeship training for new personnel should be abandoned; it is only to say that in-service type programs might provide the best new effort to serve educational R&D during the 1970's. While the 50's and 60's were more concerned with manpower shortages, the 70's should be more concerned with existing manpower development.

The program being evaluated in this study was conducted as if there were moderate national manpower shortages. When the program was conceived a year ago, there was the feeling that educational R&D would benefit from the infusion of new perspectives, represented by experienced personnel from physical science R&D. While it is still believed that this would be the case, in retrospect from this spring of 1972, the audience was perhaps not the highest priority, given an analysis of current and immediate manpower needs. However, the program itself, was based on a very solid concept. Relatively short-term, reality-based apprenticeship programs very much need to be developed. The task in this program was to develop a new model for apprenticeship training in a real-life setting. While the model employed a population being cross trained, it would be equally appropriate for the in-service staff development with already employed trainees. The audience for training and the intent of training might vary, but the apprenticeship is still a vital supplement to educational R&D personnel development.

The Purpose of the Evaluation Study

In September of 1971 AIR undertook the development of a new model for the training of personnel in educational research and development. The impetus for this effort was based in the long felt need for programmed experiences in educational R&D which would supplement varieties of academic training with more reality-based activities. The purpose of this study is to explore the operational feasibility of that model, with recommendations for future testing of the concept on a larger scale.

The original intent of the training program was a pilot effort to develop a model. While the program had design and structure, it was intended to be preliminary and small-scale. The purpose of this evaluation study is to identify and "iron-out" the initial kinks in the development of the model and conduct of the program. In the formal sense, this study should be considered formative evaluation for future efforts, rather than a summative evaluation of the apprenticeship model.

Therefore, while an examination of student outcomes is certainly considered in this evaluation, it is by no means the only focus of the evaluation. The evaluation looks at the model as a whole. The basic inquiry is of the practicality of the model, from a variety of viewpoints. These viewpoints include not only what the apprentices learned, but how they reacted to the experience, the reactions of the host institution, the degree to which this training program and experience were unique to the setting, the difficulties in program operation, the apparent demand for such a program, the ease with which jobs were obtained by the apprentices, and so forth.

At the center of this evaluation is what we could learn by conducting the program. We were mainly interested in exploring whether or not this was a viable model. The evaluation is intended to describe and explain what happened; point out those facets which worked well and those which could be changed; and, in general, contribute to minimization of potential pitfalls, should the model be used in subsequent training efforts.

The Model to be Evaluated

The model and training experiences are discussed in considerable detail in the companion final report, Development of an Apprenticeship Work-Study Program Model for the Cross-Training of Physical Scientists for Work in Educational Research and Development (Grant No. OEG-0-71-4712).

However, to summarize, the setting was a private, non-profit research corporation (AIR-Palo Alto); the number of trainees was six; the length of the pilot test was three months; the training/education relied on a combination of lecture, independent study, and apprenticeship. For the most part, instruction was individualized; no university credit was offered. The "students" were mature workers in the process of changing vocations--namely, from research and development in the physical sciences to research and development in the behavioral sciences (i.e., education). The general idea was to see if an educated and experienced group, which was, however, naive about educational research and development, could receive enough training in a relatively short period of time to make them effective workers, attractive to potential employers in educational R&D.

The "students" were six unemployed aerospace professionals. The fact that these were unemployed physical scientists had little crucial bearing on the development of the model. The fact that they were all physical scientists had a great deal to do with the model. The model was developed not to be a substitute for formal training but rather a complement. Therefore, the main problem with such a group was not one of training, per se, but rather the transfer of old skills to a new area--"cross-training," as it were, rather than training or retraining.

While at AIR, the students participated in lectures and seminars in key areas of education; independently studied areas related to either these key topics, topics of interest, or topics related to work activities; and participated in apprenticeship activities under the guidance of senior and project AIR staff. At least 50% of the time during the 13-week training program was devoted to apprenticeship activities. In most cases, independent study and apprenticeship activities were unique to the student. Students were expected to study and work over the course of the normal AIR work-day of 8:30 AM to 5:00 PM, and in many instances, beyond those hours when topics or activities demanded special attention. For their efforts, they received a stipend of $75 per week plus $15 per week per dependent to cover living and relocation expenses.

In short, the basic idea was to conduct a relatively short-term, work-oriented apprenticeship program for unemployed aerospace personnel to train them for work in educational research and development as an alternative exploration to existing and traditional programs.

CHAPTER 2

THE NATURE OF THE EVALUATION

Organization of the Evaluation

Although the model has four conceptual components (recruitment/selection, instructional, apprenticeship, and job placement), they are somewhat restrictive as the sole structure for the organization of evaluation. It is true that certain issues for exploration are based in a single component, but there are questions of interest which cut across components, such as trainee reaction to the general program experience. In order then, that the assessment draw comprehensively from all appropriate data sources and be conceptually flexible, the design focused on a series of key questions. They are:

A. How effective is the program in terms of knowledge and skills gained?

B. How successful is the program?

C. How generalizable or exportable is the model?

D. What is the trainee reaction to the program experience?

E. What should be the content and procedures for follow-up?

F. How responsive is the manpower pool?

G. What procedures should be followed for the selection of trainees?

H. What are the implications to the host institution in conducting an apprenticeship training program?

I. What are effective procedures for the monitoring of trainee progress?

J. What is the role of traditional tests in trainee selection and assessment?

K. Who applied? What were their characteristics?

L. What were reasons for applicant rejection and were they viable in retrospect?

M. In addition to <u>how</u> might trainees be selected, <u>who</u> might be

selected in future replications of the model?

N. What modifications of this model, or other types of models, might be considered in future efforts?

There are, then, fourteen questions and issues of interest to be explored in this evaluation. The first thirteen are discussed in Chapter 3, and the last question is discussed separately in Chapter 4.

Data Sources and Instrumentation

While a trainee sample of only six would be too small for a comprehensive evaluation of a training model, it is sufficient to entertain questions of the operational feasibility of a model. As such, it is highly desirable to do so prior to large-scale model implementation and evaluation.

Data gathering devices included an analysis of telephone responses, a standardized test, an application form, a writing sample, personal interviews with trainees and AIR staff, survey questionnaires, a weekly chronicle of activities and reactions, self-ratings, staff observations and critical incidents, behavioral records and unobtrusive measures, and staff ratings.

In order to provide a comprehensive picture of when and how the data were gathered to address the various questions of interest, the sources employed for each question will be presented separately in this overview:

A. How effective is the program in terms of knowledge and skills gained?

A variety of sources were drawn upon. These included:

(1) A trainee analysis of the degree to which each was able to meet the various objectives of the objectives bank proved to be highly informative. The format of the working instruments which each trainee used was designed to account for those objectives which were attainable before the program, those which were enhanced by the program, and those which could now be accomplished only because of the program. In addition, the objectives are clustered into eleven topical areas. A sample of this instrument is offered in Appendix A of the companion final report on the training program itself. In addition, a summary of those responses is offered in Section A of Chapter 3 of this report.

(2) A pre- and post-standardized instrument in educational areas was also employed. The instrument selected was the Undergraduate Record Examination in Education published by Educational Testing Service. It is a two-hour test which deals with broad areas of educational problems. Trainees were administered the test as part of the selection procedure prior to the start of the program, and underwent a readministration of the test during the last week of the training program. While statistical pre, post-analysis could not be performed on the group as a whole, a description of the individual change scores was a point of interest.

(3) In a final survey questionnaire, trainees were asked to specify those areas in which particular growth had been noted, and, in addition, to offer an overview statement about the degree to which the training program had generally enhanced their knowledge of educational research and development. A sample of that questionnaire is given in Appendix A of this report.

(4) Throughout the program, supervisory staff were queried as to the static or increasing effectiveness of apprentices within their apprenticeship activities. These were not tendered in a formal document, such as a questionnaire, but consisted of irregularly spaced interviews with senior staff, the content and timing of which depended on the apprentice, what was being done in the apprenticeship, and how long it had been in process.

(5) Throughout the program, the immediate staff of the project had close contact and working relationships with the trainees. The observations of staff, the noting of critical incidents, the summaries of trainee behavioral records, and an awareness of assorted unobtrusive measures all contributed to evidence of trainee growth or lack thereof. These included the degree to which there were quicker understandings of problems and tasks with a reduction of questions for guidance from staff, greater initiatives in task accomplishment, an awareness of sources of information, and the general ability to discuss and make contribution to problem solution in educational topics. This evidence did not take the form of ratings in the strict sense, but were verbally codified at weekly staff meetings.

B. How successful is the program?

The word "successful" has two related meanings here. The first is the degree to which the program produced "graduates" who are attractive to potential research and development employers; the second criterion, which is in the long run perhaps the most important, is whether the trainees obtain employment. Sources for this issue are fairly straight-forward. They include:

(1) inquiries from potential employers who were aware of the program's existence;

(2) the extent to which trainees gained contacts and received interviews from potential employers;

(3) the degree to which AIR was interested in hiring one or more of the trainees; and

(4) whether or not the apprentices ultimately secured employment.

C. How generalizable or exportable is the model?

This question is not based in any one type of data source or answerable through any of the particular data gathering devices thus far employed. It can be easily understood that this is an issue based on judgment and total experience. The simple question is whether or not this training program could be done in another setting. There are many factors of an environmental or geographic/demographic nature which were explored. These included the location of AIR in Palo Alto, the availability of materials at this particular site, the variety of apprenticeship activities offered by AIR and the surrounding community, and manpower availability.

D. What is trainee reaction to the program experience?

Data sources included:

(1) a diary manintained daily and submitted weekly by trainees. These "logs" included trainee reactions to activities, program content, staff relations, apprenticeships, and general program experiences;

(2) the final survey questionnaire which queried trainees in one of its sections as to their summary judgments of the training program experience;

(3) informal comment and conversations with trainees which were noted throughout the program and summarized in the program monitor's program development summary.

E. What should be the content and procedures for follow-up?

Again, the answer to this question is a matter of accumulated judgment. However, one approach was developed and utilized which was particularly

well-suited to a small sample of trainees. This was:

(1) a two-month follow-up telephone survey.

While the medium of the telephone was well-suited to six people, the structure of the questions would generalize to any number of persons being followed up. The questions asked in that survey are given in this section. For larger samples, a mailed questionnaire would have been appropriate.

F. How responsive is the manpower pool?

The main data source was:

(1) an analysis of the density of telephone inquiries in response to initial public notification of the program, and a companion analysis of the number of inquirers who followed up with actual submission of the application form.

G. What procedures should be followed for the selection of trainees?

This question must again be ultimately based on experience. However, a reference point is offered by the techniques employed in the program. They included:

(1) an application form;

(2) a standardized test on educational problems;

(3) a writing sample;

(4) a personal interview; and

(5) multi-stage staff ratings.

H. What are the implications to the host institution in conducting an apprenticeship training program?

Main sources of information on this issue included:

(1) interviews with AIR staff who were involved with apprenticeship and seminars;

(2) interviews with senior AIR administrative staff;

(3) summary reactions of immediate program staff.

I. What are effective procedures for the monitoring of trainee progress?

Again, the ultimate answer lies in accumulated judgments, but reference points have been provided by:

(1) weekly or bi-weekly conferences between each trainee and the program monitor;

(2) the system of daily log-keeping by each trainee;

(3) a mid-program and final-program self assessment by each trainee of objectives attained; and

(4) staff observation.

J. What is the role of traditional tests in trainee selection and assessment?

Data for this question were sourced in:

(1) the judged effectiveness of the twice-administered standardized test, and

(2) the judged appropriateness of alternative instruments which were examined for potential application.

K. Who applied? What were their characteristics?

The sole data source was:

(1) selected data from the application form.

L. What were reasons for applicant rejection and were they viable in retrospect?

This question was explored through:

(1) records maintained during the selection process; and

(2) judgments of the selection committee gathered through informal interviews.

M. In addition to how trainees might be selected, who might be selected in future replications of the model?

No one data source was appropriate to answer this question. The issue is speculative and is based on discussions with staff about the characteristics of people who might have had the potential to successfully adapt to such a program.

N. What modifications of this model, or other types of models, might be considered in future efforts?

The data base for this question obviously draws comprehensively from all the preceding questions and their data sources. No one source can be particularly identified. The results are not really answers, but rather suggestions and possibilities given one type of total program experience in one model.

It is important to note that in this and other questions of its type, the data base is experiential and the suggested conclusions and recommendations make no pretense as being the only or final answers. They are offered as preliminary findings based on the accumulated, and hopefully sound, judgments of experienced professionals in educational research and development.

CHAPTER 3

EVALUATION OUTCOMES

As noted in Chapter 2, each issue for evaluation is presented in separate sections of this chapter. The thirteen questions are identified by sections A through M. The body of each section contains the related general findings, and a discussion which includes comments, conclusions, and/or recommendations.

A. *How effective is the program in terms of knowledge and skills gained?*

Findings Based on Objectives Mastery

The most definitive information on this issue is found in a summary of self-ratings by each trainee on the objectives bank which was used to define the overall curriculum of the program. A system of self-assessment was employed as the only realistic substitute to actually testing each trainee on each objective. The development of that instrumentation was not feasible given the limits of the program. However, self-assessments were modified or supported by staff observations, where possible.

The bank consists of 130 objectives, which are clustered into eleven areas. The number of objectives in each area is as follows:

Library Skills	17
Instrumentation	10
Data Collection	21
Data Analysis	10
Proposal Preparation	10
Product Development	13
Evaluation	15
Marketing, Dissemination, Implementation	10
Write-up and Publication	5
Scheduling/Management	8
Apprenticeship Experiences	12

Trainees were asked to indicate which of the objectives could be met before the program, which were acquired only during the program, which could be performed before the program but were supplemented by the program, and which objectives could not yet be performed at the time of inquiry. In addition, of those objectives which could be performed, trainees were asked to indicate their degree of expertise for each, i.e., slight, moderate, or strong.

This instrument was administered on two different occasions. When it was administered at the mid-point of the program, further information was obtained as to which of the objectives each trainee would like to emphasize

in the balance of the program. The main purpose of the mid-point administration was to assist the program monitor in assessing progress to date, and to provide guidelines for future learning activities. The instrument was re-administered at the end of the program as a summary effort. That final administration formed the basis for the discussion to follow.

While each and every one of the 130 objectives will not be discussed here, the eleven topic areas can be explored as separate groups. A number of summary statements are evident.

> *On the average, there was no one category where participation in the program was the sole reason for all the trainees now being able to fulfill all the objectives.

This would obviously not be expected for a variety of reasons. Primary among these reasons is that the trainees were selected because they were already able to perform certain skills relevant to educational R&D when they entered the program. The picture might have been different had the sample been totally naive.

> *Looking at only the skills which can now be performed, it is interesting to note that in eight of the eleven topical areas, the number of trainees who felt that the program was a) either the sole source of skill development or b) supplemented development of previous skills, exceeded the number who felt that they could perform the skills in the area just as well before the program.

In order of magnitude, these topical areas on which the program had greatest impact for the group as a whole were:

- Data Anlaysis
- Proposal Preparation
- Instrumentation
- Product Development
- Evaluation
- Library Skills
- Data Collection
- Marketing, Dissemination, Implementation

It is not in the least surprising that the impact of the program was most highly felt in the areas of Data Analysis, Proposal Preparation, and Instrumentation. As part of guided, independent study activity, the trainees worked through modules on data analysis which were being developed by AIR for the Far West Laboratory, and were in the final draft stage. These

exercises provided substantive knowledge in data analysis, as well as experience in product review and refinement.

In regard to proposal preparation, four of the six trainees had direct contact with either the writing or production of proposals. The fact that the program influenced skills in this area is also not surprising. In addition, proposal writing is a common task at private research houses such as AIR, as well as being a recurring topic of conversation. A trainee who spends three months in such a milieau learns a great deal by watching and listening, to say nothing of actually participating.

The area of Instrumentation was enhanced due to the kinds of activities which are also common to AIR type organizations. Within the variety of apprenticeship positions, all trainees had contact with either the development or utilization of forms, questionnaires, data summary sheets, manuals, and the like. These are common to many research and development activities.

*The program seemed least effective in the areas of Write-up and Publication, Data Collection, and Marketing, Dissemination, and Implementation.

This was due in part, to a lack of immediate interest on the part of the trainees, and in general, to the fairly short time span of the program; these are activities for which long term involvement and commitment are likely to be characteristic.

*When the program is looked at as the sole source for objectives attainment, the areas to which the greatest average number of trainees responded that they could not have performed certain of the objectives unless they had been in the program were:

- Library Skills
- Product Development
- Evaluation.

While these areas were not as strongly developed as some others by the end of the program, on the other hand, there was not a comparable base of expertise at the beginning of the program. However, growth was experienced, and perhaps, given the starting points, the most relative growth took place in these three areas.

*The areas in which the trainees felt they were strongest before the program started were:

- Scheduling/Management
- Apprenticeship Objectives
- Proposal Preparation
- Data Analysis

*Those areas of the program which were most active in in enhancing previously acquired skills were:

- Proposal Preparation
- Apprenticeship Objectives
- Scheduling and Management

This is to say that of those skills which could be performed before the program, additional inputs were made to the greatest degree in these three areas. Thus, the combination of background expertise and additional training makes these areas among the strongest in the trainees' repertoires.

At the end of the program, it can be summarized that trainees, as a group, ranked their strengths in the eleven topical areas as:

(1) Apprenticeship Objectives
(2) Data Analysis
(3) Proposal Preparation
(4) Scheduling/Management
(5) Instrumentation
(6) Library Skills
(7) Product Development
(8) Evaluation
(9) Write-up and Publication
(10) Data Collection
(11) Marketing, Dissemination, Implementation

Thus, in summary, it can be said that the training program was strongest in the reinforcement and transfer of existing skills. In addition, growth was made in areas which were relatively new to them in an educational context such as Library Skills, Product Development, and Evaluation. There were three areas in which the trainees had relatively little past experience and on which the program made relatively little impact. It is likely that growth in these areas would also have been experienced given greater interest and longer program tenure.

On the immediate pages are presented the individual responses of the trainees to this objectives survey (Table 1). The numbers in the boxes indicate the number of trainees who responded to the various stems for each objective.

TABLE 1

Objectives	Could do before program	Acquired during program	Program enhanced previous skill	Can't do	If can do: Degree of Expertise: Slight	Moderate	Strong
Library Skills							
Can describe the organization of a card catalogue and locate entries regarding: a. author-title b. subject c. documents d. pamphlets e. tests	5	0	1	0	0	4	2
State the general structure and types of information given in sources particularly associated with education: a. Education Index b. Psychological Abstracts c. Encyclopedia of Educational Research d. Dissertation Abstracts e. Relevant ed. sections of Guide to Periodical Literature	3	2	1	0	1	4	1
Describe the types of information available and be able to locate and obtain documents and information from the DATRIX and ALERT systems.	0	1	0	5	1	0	0
State the function and organization of the ERIC system.	1	4	1	0	0	4	2
Describe the types of information stored in the ERIC system, the various reference tools used, and the forms in which ERIC documents are supplied.	1	4	1	0	0	4	2
Explain the procedure for ordering hard copy and microfiche copies from ERIC.	1	4	1	0	1	4	1
State the content and structure and locate and interpret entries in the ERIC reference tools of Research in Education and Current Index to Journals in Education.	1	4	1	0	1	3	2
Library Skills (cont.)							
State the function and organization, interpret, and use the Thesaurus of ERIC Descriptors.	1	5	0	0	2	2	2
Describe the function of and state the general procedure for retrieving information through the ERIC DIALOG system.	0	2	0	4	0	1	1
Can locate and use special equipment and devices typically found in libraries, such as microfilm readers.	4	0	1	1	0	3	2
Prepare a statement of purpose of a survey of the literature related to a given topic or problem in education.	4	1	1	0	0	4	2
States descriptors or key words to guide the search.	2	2	2	0	1	3	2
Prepares a detailed search strategy.	2	1	1	2	1	2	1
Retrieves bibliographic entries and documents and prepares bibliographic cards according to a standard format.	4	0	0	2	1	2	1
Can scan and screen retrieved documents for relevance.	3	0	2	1	0	3	2
Prepares abstracts or annotated bibliography of relevant documents covering brief statements of problem, sample, method, findings, discussion.	5	0	1	0	1	3	2
Classifies, indexes, and organizes bibliography cards and abstracts with such as McBee sort cards.	4	0	0	2	1	2	1

TABLE 1 (continued)

Objectives	Could do before program	Acquired during program	Program enhanced previous skill	Can't do	If can do: Degree of Expertise: Slight	Moderate	Strong
Instrumentation							
Describe, state the functions of, and discuss the advantages and disadvantages (where applicable) of equipment with application in education (e.g., programmed learning machines, student response systems equipment commonly used in experimental situations, automated assessment equipment).	3	3	0	0	2	4	0
Be able to locate sources of hardware.	3	2	1	0	2	3	1
Name and describe the common types of data gathering and assessment instruments, e.g., questionnaire, essay, interview schedule, critical incident instruments, and the various types of objectives tests--multiple choice, true-false, short answer, matching, etc.	3	1	2	0	0	5	1
State the purpose (or common applicability of), advantages and disadvantages of various types of instrumentation.	3	1	2	0	3	3	0
Discuss the guidelines for quality commonly associated with various types of instruments (as to presentation and layout).	2	1	1	2	3	1	0
Summarize the basic statistical concepts associated with tests such as reliability, validity, item sampling, correction for guessing, measurement error, item analysis, etc.	3	1	2	0	3	2	1
State the general principles in writing objectives test items such as appropriateness of content and difficulty, brevity, accuracy, single answer, grammatical correctness, positive wording, absence of dependent cues, etc.	3	2	1	0	5	1	0
Objectives							
Instrumentation (cont.)							
Discuss a general strategy for planning and developing assessment and informational instruments.	0	2	2	2	4	0	0
Describe general content and structure of a variety of commonly used instruments, e.g., Stanford-Binet, MMPI, etc.	3	1	0	2	3	1	0
Be able to locate or obtain specimen sets of tests through libraries or companies.	2	1	2	1	1	4	0
Data Collection							
Can describe the general nature of a variety of interviewing techniques (e.g., structured, focused, etc.)	1	1	1	3	0	3	0
Can plan and develop interview schedules which represent various interview techniques.	0	2	0	4	0	2	0
Given specific R&D problems, discuss the application, advantages, and disadvantages of various interview techniques.	0	2	0	4	1	1	0
Can apply appropriate interview techniques in conducting interviews of the types likely to be used in R&D projects.	1	2	0	3	1	2	0
Can describe the general nature of a variety of observation techniques (e.g., time sampling, anecdotal record, etc.).	1	1	1	3	1	2	0
Can plan and develop observation schedules which represent various observation techniques.	0	1	1	4	1	1	0
Given specific R&D problems, discuss the application, advantages, and disadvantages of various observation techniques.	0	1	1	4	1	1	0

TABLE 1 (continued)

Objectives	Could do before program	Acquired during program	Program enhanced previous skill	Can't do	If can do: Degree of Expertise: Slight	Moderate	Strong
Data Collections (cont.)							
Can apply appropriate observation techniques in conducting observations of the types likely to be used in R&D projects.	0	1	1	4	1	1	0
Summarizes the basic principles associated with standardization (e.g., commonness of directions, timing, etc.).	2	0	1	3	1	2	0
Explains why standardization is important and can identify those assessment situations with which it is most likely to be associated or not particularly associated.	2	0	1	3	1	2	0
Identify the ranges of expertise and training required to administer various types of tests under certain conditions such as group, individual, children, etc.	1	0	0	5	1	0	0
Identify common problems for which specific types of tests are used to collect data.	1	0	1	4	3	0	0
Identify the conditions under which various tests are commonly given.	1	1	1	3	2	1	0
Discuss how certain external conditions may affect administration or outcomes.	2	1	1	2	2	1	0
Differentiate "instrument administration" from "testing," as it is commonly used (general clarity of all those definitions)	0	1	0	5	1	0	0
Discuss the issues of protection of subjects in experimentation, confidentiality of data, subject awareness of a test situation, etc.	2	1	1	2	3	1	0
Explain how affective considerations, such as rapport, might influence testing process and results.	2	2	1	1	3	2	0

Objectives	Could do before program	Acquired during program	Program enhanced previous skill	Can't do	If can do: Degree of Expertise: Slight	Moderate	Strong
Data Collection (cont.)							
Given an experiment, discuss the kinds of measurements which would be appropriate for data collection.	2	2	1	1	3	2	0
Define the major and common terms associated with experimentation, such as "research design," "dependent and independent variables," "control groups," "hypotheses," "random sampling," "significance," "confounding," and "intervening variables," etc.	3	2	1	0	0	5	1
Identify some of the common areas of education in which basic research occurs.	0	3	3	0	1	5	0
Discuss the role of basic experimentation in educational R&D.	0	4	2	0	2	4	0
Data Analysis							
State the characteristics of and give examples of data that are based on nominal, ordinal, interval, and ratio scales.	1	2	2	1	0	1	4
Describe procedures for organizing data such as tallying frequencies or ratings, alphabetizing, rank ordering, etc.	3	2	1	0	0	3	3
Given specific types of data, prepare an organizational format.	2	2	2	0	1	4	1
Identify various types of data displays such as pie charts, bar graphs, histograms, etc.	4	1	1	0	0	4	2
State general guidelines for the preparation and construction of visual data presentations.	4	1	1	0	1	3	2
Given an organizational format containing specific types of data, prepare a visual display such as chart, graph, etc.	4	1	1	0	0	3	3

TABLE 1 (continued)

Objectives	Could do before program	Acquired during program	Program enhanced previous skill	Can't do	If can do: Degree of Expertise: Slight	Moderate	Strong
Data Analysis (cont.)							
Compare and contrast the amounts and kinds of information provided by different data displays.	3	2	1	0	1	2	3
Define basic statistical terms such as normal distribution, standard scores, measures of central tendency and dispersion, norms, derived scores, confidence interval, Type I and Type II error, significance, etc.	2	1	3	0	1	2	3
Compute common statistics such as mean, standard deviation, t's, etc.	2	1	3	0	1	1	4
State what questions various tests of significance address themselves to.	2	1	3	0	2	2	2
Proposal Preparation							
Plan research studies using defensible statistical techniques and research designs.	1	1	2	2	2	2	0
Be familiar with basic concepts of research design (e.g., random sampling, pre- and post-testing, control groups, etc.).	2	0	4	0	2	2	2
Identify a variety of funding sources and describe the kinds of R&D efforts typically funded by each (whether RFP or unsolicited or both; what special areas of interest, e.g., voc. ed., etc.)	1	4	1	0	3	2	1
Estimate the number of manhours needed to complete specified tasks.	1	0	4	1	1	4	0
Prepare statements describing agency facilities and personnel relevant to the project proposed.	3	2	1	0	1	4	1
Define, and describe the distinctions between, the following terms: proposal prospectus, bid, RFP, letter of interest.	3	0	2	1	0	3	2

Objectives	Could do before program	Acquired during program	Program enhanced previous skill	Can't do	If can do: Degree of Expertise: Slight	Moderate	Strong
Proposal Preparation (cont.)							
Given an RFP, identify the topics which must be covered in the proposal according to the specifications.	4	1	1	0	0	4	2
Write a clear statement of the problem your proposed project is addressing.	4	0	2	0	0	3	3
State the objectives and anticipated products of a proposed project.	4	0	2	0	0	3	3
Given a project, identify the kinds and sources of data to be collected and specify appropriate methods for collecting the data.	4	0	2	0	0	4	2
Product Development							
Design, produce, and validate effective instructional materials.	1	2	0	2	2	1	0
Identify sources of information on available materials.	2	2	2	0	4	2	0
Review and examine existing products for relevance to current product effort.	2	3	1	0	5	0	1
Identify elements of the current product effort which will need to be (1) adopted, (2) adapted or modified, and (3) developed or created.	2	1	1	2	4	0	0
Specify the objectives of the product.	2	2	2	0	4	2	0
Make constructive recommendations for changes in the product based on field test data.	2	1	3	0	5	1	0
Identify sources of information regarding the content of the product.	2	3	1	0	4	2	0

TABLE 1 (continued)

Objectives	Could do before program	Acquired during program	Program enhanced previous skill	Can't do	If can do: Degree of Expertise: Slight	Moderate	Strong
Product Development (cont.)							
Prepare detailed specifications regarding product development or modification.	2	2	1	1	4	1	0
Know procedures for ordering/obtaining materials to be adopted/adapted.	0	0	0	6	0	0	0
Know when copyright or patent releases need to be obtained and how to obtain them.	0	0	0	6	0	0	0
Identify characteristics of product users which will have implications for product development (e.g., reading level, etc.).	2	3	0	1	4	1	0
Establish quality-control procedures.	2	1	1	2	3	1	0
Identify sources of assistance in activities your agency is not qualified to carry out (e.g., printing, photography, etc.).	3	2	0	1	1	4	0
Evaluation							
Understand distinctions between formative and summative evaluation.	1	3	0	2	2	1	1
Understand common planning and evaluation approaches such as PERT, PPBS, CIPP, etc.	3	0	3	0	2	4	0
Given a set of objectives, identify appropriate methods or techniques for assessing whether or not the objectives have been met (e.g., observation, interview, test, unobtrusive measures, affective measures, etc.).	1	3	1	1	3	2	0
Identify examples of "unobtrusive measures."	1	1	0	4	1	1	0

Objectives	Could do before program	Acquired during program	Program enhanced previous skill	Can't do	If can do: Degree of Expertise: Slight	Moderate	Strong
Evaluation (cont.)							
Understand the meaning of such concepts as: confounding variable, intervening variable, error of measurement, sampling error.	2	2	1	1	4	1	0
Prepare a detailed plan for field testing a product.	2	1	0	3	2	1	0
Identify the kinds of information to be gathered in a field test.	2	2	1	1	3	2	0
Identify objectives of a product if not previously specified.	2	2	1	1	4	1	0
Be familiar with basic design concepts.	1	0	2	3	2	1	0
Specify conditions under which evaluation data should be collected.	1	2	1	2	3	1	0
Identify necessary arrangements to be made in carrying out evaluation plan.	1	2	1	2	4	0	0
Prepare report of product evaluation effort, including analysis and interpretation of data collected.	1	3	1	1	3	1	1
Specify procedures for analyzing the data.	1	3	1	1	3	1	1
Perform item analyses of evaluation measures/instruments.	2	0	1	3	2	1	0
Specify revisions to be made in evaluation plan/instruments based on their initial use.	2	1	1	2	4	0	0

TABLE 1 (continued)

Objectives	Could do before program	Acquired during program	Program enhanced previous skill	Can't do	If can do: Degree of Expertise: Slight	Moderate	Strong
Marketing, Dissemination, Implementation							
Given a variety of products, identify appropriate marketing outlets/dissemination modes for each.	0	1	1	4	2	0	0
Identify the target audience to be reached.	0	1	1	4	2	0	0
Given a variety of target audiences, identify appropriate marketing outlet/ dissemination modes for each.	0	1	1	4	2	0	0
Identify various methods of "advertising" a product: e.g., news releases, newsletter, journal articles, ads, demonstrations, mailings, APA, AERA, etc.	0	1	2	3	3	0	0
Know when and how to get copyrights or patents.	0	0	0	6	0	0	0
Develop simple market test plans.	1	0	1	4	2	0	0
Outline variables to be considered to determine if product is ready for implementation (e.g., necessary instructions for use developed, packaging specifications prepared, etc.).	0	0	1	5	1	0	0
Identify materials/information necessary to conduct marketing campaign.	0	0	1	5	1	0	0
Identify characteristics of target audience to be considered in preparing specifications.	0	1	1	4	2	0	0
Specify procedures for assessing effectiveness of marketing, implementation effort.	0	0	2	4	2	0	0

Objectives	Could do before program	Acquired during program	Program enhanced previous skill	Can't do	If can do: Degree of Expertise: Slight	Moderate	Strong
Write-up and Publication							
Prepare abstract of project report.	3	0	3	0	3	2	1
Be familiar with APA manual on style.	1	0	0	5	0	1	0
Write succinct descriptions of the purpose, method, results, and implications of a project.	3	0	3	0	2	2	2
Given a variety of specific paper topics, identify (a) appropriate publication sources and (b) appropriate oral presentation forums for each.	1	1	1	3	2	1	0
Given a draft of an article or a report, review and critique it for (1) content, (2) style, and (3) technical soundness.	3	0	2	1	3	2	0
Scheduling/Management							
Estimate number of man hours necessary to complete specified tasks.	3	0	3	0	3	3	0
Estimate costs associated with completing specified tasks.	4	0	1	1	4	0	1
Write detailed job descritpion for (assumed) vacancy.	4	0	2	0	2	3	1
Interview candidate for job position.	3	0	2	1	1	4	0
Outline methods for planning, monitoring, and evaluating accomplishment of tasks.	4	0	2	0	2	3	1
Identify work objectives.	4	0	2	0	1	4	1

TABLE 1 (continued)

Objectives	Could do before program	Acquired during program	Program enhanced previous skill	Can't do	If can do: Degree of Expertise: Slight	Moderate	Strong
Scheduling/Management (cont.)							
Prepare progress reports.	4	0	2	0	1	4	1
Set up systems for documenting project progress.	4	0	1	1	0	2	3
Apprenticeship Experiences							
To know and be able to access appropriate knowledge and information sources.	3	0	3	0	1	2	3
To organize and manage data collection procedures.	3	1	1	1	0	2	3
To assist in the codification, analysis, and presentation of data and information.	4	1	1	0	1	2	3
To design and specify the requisite tasks for an area of materials development.	3	1	2	0	3	2	1
To organize, coordinate, and manage the production of developmental materials.	3	1	2	0	3	2	1
To make substantive content or idea input to materials development.	4	1	1	0	2	2	2
To develop, under supervision, draft materials.	4	0	2	0	0	5	1
To be a constructive partner in the review of RFP's, and the development of proposals. This requires familiarity with Federal sources and processes, and familiarity with such documents as the Commerce-Business Daily.	3	2	1	0	1	3	2
Exhibit reliability and dependability in finishing an assigned or assumed task when it is needed.	3	0	3	0	0	1	5

Objectives	Could do before program	Acquired during program	Program enhanced previous skill	Can't do	If can do: Degree of Expertise: Slight	Moderate	Strong
Apprenticeship Experiences (cont.)							
Be thorough in the collection, investigation, and presentation of data and other types of information, such as literature reviews.	3	0	3	0	1	1	4
Assume responsibility for, and take seriously, the adequate completion of a task.	3	0	3	0	0	2	4
Be sensitive to and compatible with the surrounding work style, customs, and environment.	3	0	3	0	0	1	5

Findings Based on Test Results

A second contributor to the exploration of this first evaluation question was the ETS test in educational areas. The issue of the role of current standardized testing in programs such as this is briefly discussed in Section I of this chapter, but suffice to say here that initial expectations were that pre- and post-program score comparisons would not offer very interesting results.

In general, the thinking was that the specific items on the test did not, for the most part, reflect program activities. Therefore, if very little score increments were noted, it would have been neither surprising nor disappointing. However the test, initially used in the selection process, was readministered, nonetheless, as a point of interest.

The test was heavily laced with topics such as educational history, noteworthy educational theorists, classroom management techniques, and learning theory. None of these topics was stressed to any degree in the program, save, perhaps, learning theory. However, for reasons including assigned readings and informal discussions, trainees picked up knowledge in these areas to a surprising degree. Individual test score gains of the six trainees ranged from 5% to 43%, with an average gain of 19%.

Considering that trainees were in the program only three months, and that the staff made absolutely no attempt to "teach to the test" or even review it after the initial administration, these gains are considered quite remarkable, even considering measurement error. One trainee commented that his increment did not seem to be so much due to any particular directed study, assigned readings, and the like, as it was to just being in an environment of educational research and development and developing a somewhat different way of thinking about education. Both trainees and staff were pleasantly surprised at these outcomes.

Findings Based on Trainee Survey

A third source of information on this question was the previously mentioned trainee survey completed during the last days of the program. The first three questions of the survey are of particular interest here:

(1) To what extent do you feel you know more about educational R&D in general, than you did thirteen weeks ago?

(2) In which specific topic areas did you gain the most information from the program?

(3) What specific skills related to educational activities were additionally or solely developed because of your participation in the program?

Trainees responded to these questions in the form of open-ended essays. For the sake of clarity and integrity of reproduction, some key phrases from those responses are directly quoted below for each of the three questions.

Trainee Responses

(1) To what extent do you feel you know more about educational R&D in general, than you did thirteen weeks ago?

> ". . . I gained most information about the balance between educational research efforts and developmental efforts. In my opinion, funds spent on development far outweigh those spent on research although the creation of more firm knowledge of research is needed before more development is justified."
>
> "I have become acquainted with some of the products and systems developed such as CAI, programmed materials teaching modules, etc., and feel almost like I have met B. F. Skinner."
>
> "Thirteen weeks ago I knew what the average citizen knows about educational r&d which is to say that I was passively aware somewhere some activity was probably taking place, other than in the universities. Now I know where much of this activity is taking place, what types of institutions and people are involved, the sources of funding that supports this research, and something about the general nature of this research and the direction it is taking."

(2) In which specific topic areas did you gain the most information from the program?

> ". . . Skinnerian analysis of behavior, instructional objectives, programmed learning, the use of incentives, statistical procedures applicable to educational research, observing and interviewing, the psychology of development."
>
> ". . . proposals, instructional materials."
>
> "My greatest gain was in learning about the specific areas in which AIR employees are funded and are currently working."

(3) What specific skills related to educational activities were additionally or solely developed because of your participation in the program?

> "The thirteen weeks was a most welcome opportunity to think deeply about education. This process included, I believe, some increase in my ability to identify problems (by reading and discussion), analyze them, and record the results in writing. I know of no skills solely developed because of the program."
>
> "I feel that skill development was rather minimal, as the areas . . . in which I have had no experience were not obviously offered in the program."
>
> ". . . the management of research data, the use of statistics, interviewing, unobtrusive measures of behavior, use of ERIC, the development of questionnaires, general knowledge skills in the areas of educational psychology, funding sources and proposals, educational products (knowledge and developmental), the use of incentives and reinforcement, and the specific skills needed for the development of training courses and modules."
>
> ". . . the skill of locating the right information source for a particular problem."
>
> ". . . writing proposals and instructional materials, research - library skills."

These responses obviously reflect varying degrees of intensity and detail. The trainees varied considerably as to their expressiveness and the degree to which they perceived the program to be providing new experiences and opportunities in various specific areas. Each response was quite different, which no doubt reflects the individual differences of the trainees, as well as the intended, individualized nature of the program. However, it is judged that common to most of these responses is a degree of sophistication about educational research and development which was not likely to have been exhibited prior to the start of the program.

Findings from Staff

Finally, in terms of staff opinion, the trainees made effective contributions to ongoing tasks, and in two or three cases, outstandingly so.

Apprenticeship supervisors generally felt that the nature of assigned tasks were quickly grasped, and that the performance of those tasks was more than adequate. By way of specific citations of knowledge and skills demonstrated, one trainee wrote very well, had some long-fomenting ideas on the educational process, and took the program opportunity to combine these in the production of two different position papers related to ongoing projects at AIR. Another trainee who had previously been very naive about library research, very quickly learned about the major documents and search processes in education and conducted a thorough literature review as part of an apprenticeship activity. In two other instances, trainees made strong inputs in the development of data collection instruments and a manual.

In general, the staff felt that there were no particular skills or knowledges which were outstandingly common to all of the trainees, save the general ability to easily handle routine tasks as would be the case with any educated, experienced worker. It was the opinion that trainees performed differentially well in different areas when tasks called for more sophisticated activity. In these instances, these abilities were called upon in the various apprenticeships. However, as indicated, trainees were also given the opportunity to learn and practice skills previously foreign to them, such as educational literature reviews and instrument design. These skills appeared to be adequately developed within the program, but called for additional monitoring and guidance on the part of the staff.

Discussion

It is first obvious to note that each trainee emphasized different skill areas, and that furthermore the intensity with which each was dealt varied considerably from trainee to trainee. It is not possible to cite any one skill or knowledge area which was equally attended to or practiced or developed by all trainees. This was certainly one outcome of having individualized the program. However, as a general statement, it is certain that the program had considerable impact.

Every trainee was far more capable of functioning in an educational R&D environment at the end of the program as compared to the beginning of the program. There is strong evidence for this in the initiatives exhibited in conducting and completing tasks, in the sophistication of questions and conversations concerning education, in the awareness of materials and sources of information, in the adaptation to the work style and goals of an educational R&D agency, and finally, in the growing confidence of staff that all the trainees were approaching the point where they could dependably and intelligently make inputs to tasks usually reserved for more experienced workers.

Given any educated and industrious worker, not enough can be said for a broad range of experiences in educational R&D. The seminars, inde-

pendent study, and discussions were all valuable in providing focus and perspective, an understanding of the setting, and a knowledge of some of the more esoteric vocabulary. But the apprenticeship itself was felt to be of greatest value, at least from a staff point of view, for it appeared to be closest to the heart and intent of the model, offered the most day-to-day reality of what it means to work in educational R&D, and provided the strongest foundation for the development of effective workers.

The trainees apparently did not quite share this view. Question #5 of the final survey asked which of the various types of activities seemed to be most useful in the acquisition of skills and/or information, i.e., seminars, independent readings and contacts, informal discussions, apprenticeship activities. While most mentioned the apprenticeship as being particularly valuable, not one listed it first as the outstanding component. The top choice was split between seminars and independent readings.

Perhaps the disparity lies in the question, for it did not specify whether it meant skills and knowledge in <u>education</u> or skills and knowledge in <u>educational R&D work</u>. These different views on the question might suggest differences in views on the program itself between staff and trainees. Perhaps the reality-based, work-oriented nature of the program should have been stressed more, or verbalized more often. It is suspected that trainees viewed the program as more academic than the cross-training of their skills to be applied in day-to-day work in a different setting.

This does not necessarily mean that the model needs to be different, but rather that the communication of the importance of the work portion of the model be clearer. This issue is basically one of understanding the purposes of the various components of the model: as indicated, it did not seem to make any apparent difference in the quality of apprenticeship activities of each trainee.

From a trainee viewpoint, the most <u>overt</u> gains of the program seemed to be generally in the areas of orientation to educational R&D and terminology. After those initial foundations, they seemed able to draw on their own resources. This was desirable, for the program was intended to be one of transition. Trainees were expected to bring something to the program, and they were very much in accord that what they all had the most of was general problem solving skills. The program to them was the opportunity to reapply these skills in a new setting with a slightly different texture to the problems.

To try to get the trainees to be consistently more specific about what these skills were was an extraordinarily difficult task which was resisted. While their expression was accomplished at various levels, these skills were rarely expressed at very specific levels. In terms of finite explication, this effort was, in the end, not as specifically comprehensive as had been hoped. However, the purpose of doing this in the first place was to

identify trainee strong points and special interests, in order that they might be reinforced in studies and apprenticeships. This was accomplished, but the process was not as easily defined, regulated, or predictable as originally had been thought.

The problems in this may not have lain solely with the trainees relative inability to easily express their specific skills, for it could probably be equally admitted that the field of educational R&D has a similar problem. While a great deal of progress has and is being made, there is not, as yet, an agreed-upon, comprehensive, specific skills bank relative to educational R&D; there have simply been few systematic explications of the myriad of tasks involved in RDD&E work. In addition, there have been few efforts, if any, to formalize assessment criteria. The program did employ a sizable pool of knowledge and skills objectives which were based on recent efforts, such as those of the Far West Lab, and also based on in-house experience. But, it is most difficult to feel secure about its comprehensiveness.

Therefore, when trainees find it difficult to express what they can do, and when the field of educational R&D has not codified itself well enough to easily explicate what it does in order to provide cues to trainees, it is easy to see that communication is less than crisp. It is, then, highly recommended, that efforts toward this codification continue in earnest, for it is basic to calculated and directed personnel training in educational research and development. There also need to be additional efforts directed toward the development of assessment instruments, given task and skill identification.

There is a related issue in the degree to which academic type studies in education are related to actual educational R&D work. Personnel training in this area, and in this model, was mainly designed to produce effective workers. The fact that they might also be knowledgeable scholars is additionally important, but secondary. There have been few efforts to separate knowledge in education from skills in educational R&D work. They are not necessarily the same, and, in many instances, would not have a functional relationship. However, it is easy to think that such would be the case, for it is the natural inclination of the basically academically-oriented field of educational R&D personnel. In this program, for example, in spite of efforts to the contrary, we initially tended to fall into the trap of treating the trainees more pedagogically than pragmatically. It quickly became apparent and we quickly reminded ourselves that we were not there to entertain trainees with academia, but to do every-day work, and to share those experiences with the trainees. Academics had to be covered where necessary, but we frequently needed to remind ourselves that this was not our reason for being. There is no ready resolution, but frequent reminders to both staff and trainees that apprenticeship programs emphasize work more than basic academics might contribute to a better focusing of common goals.

In summary, it is evident from the results that knowledge and skills in education and knowledge and skills in educational R&D work were indeed absorbed by the trainees. Much of this effort on the part of staff was calculated and it worked with each trainee to varying degrees. There were some hesitant steps in not having a comprehensive educational R&D objective bank, in not having assessment instruments, and in occasionally shifting emphasis from work to academia. But, the first two will be solved with future efforts in these directions, and the third is a matter of constant awareness on the parts of both staff and trainees.

Given the length of the program, it must be termed a success in the acquistion of knowledge and skills. There is no reason to believe that such would not be the result on a larger scale.

B. *How successful is the program?*

As mentioned in Chapter 2, the word "successful" had two originally intended meanings. The first had to do with whether the program produced "graduates" who would be attractive to this and other educational research and development organizations. This would include such factors as exhibiting familiarity with the field, having had known successful experiences in productive activities related to educational R&D, generally having credibility and inspiring confidence, and as a result, be of interest to potential employers.

The second meaning of the word "successful," could in some sense be considered the ultimate criterion of program effectiveness, and that was whether or not trainees secured employment.

Findings in terms of potential employability

All of the trainees would be attractive to many or all educational agencies in selected capacities. Three of the trainees would have been particularly attractive to AIR. Had we had the activities and manpower shortages to justify the act, they would have been gladly hired on a permanent basis. Respectively, their strengths were writing and educational philosophy, creative inputs to educational products, and a good knowledge of statistics, experimental design, and basic psychology.

AIR was certainly not the only group interested in a "finished" trainee. Three unsolicited contacts were received. The first occurred only three weeks after the start of the program. AIR was host to the Eighth Invitational Conference on Systems Under Construction for Career Education and Development at which the trainees were guests. The almost 100 participants represented the United States Office of Education, certain of the Regional Educational Laboratories and Research and Development Centers, private industry such as ETS and, of course,AIR, individual school districts, the military and a variety of colleges and universities. In the opening ceremonies of the Conference, all six trainees were personally introduced and the purpose of their presence at AIR briefly explained. Out of this contact came one request for resumes and, in general, more information on the trainees. The contact did not come to fruition for any of the trainees mainly due to timing. The program had many weeks yet to go, and the inquirer's staff needs were immediate. They were not as interested in a three week "graduate" as they were in a finished product.

The second unsolicited contact was by one of the Regional Laboratories. As part of the apprenticeship, one of the trainees had participated in the thinking, writing, and production of a series of papers on the Employer Based Career Education Model. AIR was under contract to the Far West Lab at the time for this task. Because of this association, the trainee was asked to submit his resume to FWL, and was promptly hired by the Lab,

on a temporary basis, even before the training program was complete. During the employment, solid and satisfactory inputs were made to the task at FWL.

The third inquiry came from one of the local community colleges who had been a cooperating partner in apprenticeship positions. As part of the college's overall planning and funding promotion activities, it was seeking one staff member to serve as Research Analyst. Two trainees were involved in these negotiations and competed with a number of applicants who had had no contact with the training program. The outcome was that one of the trainees was hired for the job.

Findings in terms of actual employment

Given that there was interest in the trainees, the second issue of actually obtaining jobs in now addressed.

As indicated, one trainee found employment as a research analyst at a local community college (De Anza). The specific nature of the job calls for an analysis of the college's various educational programs in order to determine their relevance and cost-benefit to the community.

A second trainee became Coordinator of the Work Experience Program at Gavilan College in Gilroy, California. This program deals with the securement and certification for credit for work experiences of students which are outside the formal academic program. Both of these post-program jobs exceed $12,000 annual salary.

A third trainee was employed on a part-time basis by AIR to continue work he had begun during the apprenticeship portion of the training program. While funds do not now permit regular employment, he is on-call for work on a contractual basis when needed.

The fourth trainee was recalled by his previous employer, Boeing. While the new job is not identical to the old, it consists of a reapplication of his existing skills. While the trainee was keenly interested in education, and the new job holds no more security than the last, he could hardly turn down "a bird in the hand" after having been unemployed for some time.

There were also two additional job offers to these employed trainees. One was tendered during temporary employment offering the possibility of permanent employment, contingent upon receipt of a contract. However, the contract did not materialize.

A second offer was made to another trainee to administer psychological tests to patients at a psychiatric clinic in Florida. The trainee had not as yet made a decision at the time of this report.

Therefore, counting the temporary employment of one trainee during the training program, six temporary or permanent job offers were potentially or actually realized for four of the trainees, and five of these six offers were directly involved with some phase of educational R&D activity.

Discussion

The initial contacts were highly encouraging as to whether or not trainees might be attractive to potential employers. Agencies in no way seemed to be "put off" or discouraged from considering the trainees for their staffs. This is in spite of the fact that the program was relatively short and that the backgrounds of the trainees were in areas not directly related to education. There appeared to be no particular problem in joining the trainees with other more logical personnel in the pools of applicants. This is no doubt related to the perceived needs of educational R&D agencies to have diverse competencies on their staffs.

AIR interest in the trainees was quite strong. Perhaps it is not fair to compare this interest to those interests of groups who had not had direct contact with the trainees: we had the advantage of knowing the skills and competencies of each trainee through three months of experience. Perhaps the key point here is that even after that, some of these personnel became more attractive than ever as potential employees. Given some work experiences and familiarity with educational R&D, it grew more difficult to tell the trainees from regular junior staff. In these terms, the program does indeed work.

This association with AIR seemed to be highly important to the trainees to a much greater extent than was ever previously imagined or predicted by the staff. There seemed to be some unspoken dependence on AIR for credibility, if not for actual employment. There were occasional comments that mentioning AIR within the community was met with recognition, and this strengthened the trainees's position. There were additional comments in a half-serious, half-jesting manner, that if AIR got some new contracts which required additional staff, they would be employed at AIR. It is very difficult to tell just how strong this reliance was, but there can be no doubt that it existed to some degree. There seemed to be a very subtle attitude that if AIR did not give them a job, AIR would certainly find one for them. This attitude seemed to exist in spite of repeated and candid comments by the staff that we could not directly provide or obtain jobs for the trainees after the program terminated.

Future programs need to be very wary of supporting or fostering perceptions of this type. No educational organization is or can be an employment agency. While the program provided and suggested contacts, assisted in resume revision, and gave general advice, in no way could we "get" someone a job. This was mentioned during recruitment and selection and was mentioned frequently during the program, but somehow it seems that it

was never quite believed or understood equally well by all the trainees. In the long run, employment comes down to their own skills, their own contacts, and their own presentations of themselves. AIR could be and was a catalyst, but could never by the sole agent.

As a result, not all of the trainees worked equally hard at job-seeking. Some were very industrious indeed, but others delayed and were fairly unsystematic, hoping that either something would break at AIR, or that AIR would provide some break, somewhere, for them. Those who worked hardest at it were the ones who got the jobs. Those who seemed to rely more heavily on AIR did not get jobs. These activities are discussed in detail in the companion final report on the training program itself (OEG-0-71-4712).

In addition, two of the trainees were most unwilling to relocate from their established home areas--one from the Bay Area and one from Seattle. This conflicted with statements of agreement to relocate offered at the time of admission to the program. While this is not unreasonable, it is unrealistic. Both areas are pockets of generally high unemployment. Seattle is depressed in all its economic sectors, and new employment in educational research and development is highly subdued. While the Bay Area is rich in activities of this sort, it is equally rich in qualified unemployed who also do not wish to relocate. There are jobs and there is a certain amount of the usual turnover, but it is by no means a "buyer's market." Employment is not easy to find and secure.

It was hoped that all trainees would enthusiastically go wherever there were jobs. As indicated, this was asked on the application form, and all were willing to relocate. But when it came down to actually being faced with relocation, such was not the case for at least two of the trainees. They were fairly lukewarm about even applying for jobs in more distant locations such as Ohio, and even relatively nearby locations. Three trainees would not follow up leads in Sacramento, and two made little effort to follow up leads at the Far West Lab in Berkeley. This occurred even with the provision for paid travel for which these unemployed were eligible.

In addition, one trainee refused to seriously entertain the typical entry level salary ranges which were associated with these job possibilities. This, too, was known would be the case before the program started, but the actual realities of lowered salaries apparently were not genuinely faced. If these trainees had been more flexible, their chances for employment would have been considerably enhanced.

On the other hand, half of the trainees were quite flexible and vigorously pursued the strong job leads. One traveled as far as Florida and another as far as Wisconsin for interviews and follow up to their applications.

However, it is important to mention that the training program was conducted during a period of extreme economic slowdown on a national scale.

Jobs were not easy to get in any area, save perhaps medicine, certain service areas, and the like. The generally tight economic situation during this time was definitely a factor, in both an optimistic outlook on the part of trainees, and the ease with which job contacts and possibilities were established.

However, even given this, half the group is employed on a permanent or part-time basis in areas related to education, and all of the group were potentially attractive to educational research and development employers.

With a batting average at or near 50%, the success of the program is considered great, even given its modest goals. It is almost impossible to state whether or not that success rate would have been maintained had there been 75 or 100 trainees at various agencies throughout the country. There are many factors of time and place, national economy, and individual attractiveness and flexibility. However, with its small sample, the program was a success in terms of its basic criteria.

C. *How generalizable or exportable is the model?*

Discussion

There really are no "results" to this question, in the ordinary sense: it is a matter of observation and discussion. The basic issue is whether or not the program could be conducted equally well with replication at another site. The various components of the model are examined as to their transfer utility. There were four basic components: recruitment and selection, the instructional system, the apprenticeship, and job placement activities.

Recruitment and selection component

In this particular program, recruitment and selection were directed toward unemployed aerospace professionals from Seattle and the Bay Area. The specific procedures are discussed in greater detail in Sections F and G of this chapter. However, in general they were fairly traditional, were mostly done by mail, and did not involve a great deal of transportation and general logistics.

More personal contact was required toward the end of this process, and the Bay Area group was, of course, able to come directly to AIR for final screening. In the final phases of the Seattle screening, one staff member traveled to Seattle for two days for test administration and interviewing. The location of AIR in Palo Alto had, or could have, very little influence on this process.

There is no reason why much of what was done could not have been based anywhere in the country and directed toward any audience in the country. Ads could be placed in distant papers (as was done), a local contact could be established (as was done), information and application forms could be exchanged by mail (as was done), and one or two staff members could travel to distant sites to conduct the final review and selection processes (as was done). There was nothing unique about AIR's staff or location which would make this process the slightest bit difficult to conduct at other sites. The only change would be that of slight increments in expenses: should the sites be varied and at great distances, expenditures for travel and communication would accordingly exceed those of this program. However, these in no way would interfere with the process of conducting this component of the program.

The instructional component

The instructional and apprenticeship components were certainly the most unique of the four, but not to the extent that it would be impossible to replicate them at another site.

Staff

The instructional component was dependent mainly on local staff and existing materials. Local staff expertise is one aspect of the entire program which could conceivably be situation-specific. Some of the lectures/seminars were of a nature which would make them conductable at any research and development agency. They included such topics as an overview of educational research and development, the general skills involved in educational R&D, and proposal development. These should be no problem at any site. However, some other of the topics were more academically specific, and reflected the experiences, expertise, and academic backgrounds of staff members. Examples of these are behavioral objectives, developing instructional materials, and incentives and accountability. Locating staff personnel who are cognizant in these areas at any conceivable site might be a problem area in the model, for their ready-availability, and even existence, is not predictable. As it turned out, AIR had such personnel in its staff repertoire who were willing to participate in the program. However, while all these conditions might not prevail everywhere, it is strongly suspected that most major agencies would also have these general and specific capabilities among their personnel.

As a side issue, but an important one, any agency involved in RDD&E training should have these diverse capabilities. If apprenticeship training is intended to expose neophytes to the broad field of educational R&D, then the host institutions should have the capacity to reflect this range through its staff and activities. Among the more eligible agencies would be the larger, private research houses, federal and state educational agencies involved in education, the Regional Laboratories, and, probably, the Educational R&D Centers. Less effective training grounds would be new and small research agencies and specific departments of universities, for they are less likely to have a broad range of in-house competencies.

Therefore, while AIR had a great deal to offer in the way of depth and scope of expertise, it is not the only site in the country. It could well be expected that the larger, older institutions of its type in the country could provide this as well. Thus, on this particular aspect, the model is likely to be exportable and replicatable, given the obvious variations of individual competencies to be found at any one site.

Materials

The materials used in the instructional component were not nearly as situation-specific, although their identification and availability could have something to do with the capacities of AIR. Firstly, the identification of the best or most noteworthy materials in a field could easily be accomplished in-house. The immediate project staff was well aware of such fields as learning theory, child development, programmed instruction, interviewing

and counseling, statistics, measurement, and research design. If we needed to confirm materials in these areas, or identify materials in areas with which we were not as familiar, a staff member who could was nearby. Again, any major R&D agency, whose staff is professionally sound, should also have this capability.

The materials which are referred to here are, as indicated, the leading, noteworthy materials in any one field. These are most likely to be in the form of established textbooks. While these and other materials seemed relatively sufficient at the time, the staff additionally felt the need for some ready, comprehensive source on all materials related to the topics of interest, as well as some index of their difficulty or the intended, appropriate audience. These materials would include, not only textbooks, but programmed texts, games and exercises, and workbooks. What was keenly wished for was some ready-access materials identification bank, much like ERIC, but stratified differently and with more user information. Such a bank is not yet available, but its institution is highly recommended. Its aid to those who conduct training programs would be tremendous, both in terms of a time-saving device, and as confirmation that the materials used are appropriate and comprehensive.

Any conscientious program staff wants to use the best, and not necessarily what is on the shelf. This identification was far more time-consuming and uncertain than had been imagined during the design of the program. In addition, throughout the program, we constantly heard of new efforts which sounded like they might be useful, but information on these efforts was spotty. We were not quite sure where to find out more about them, how much time they would involve for the trainees, where to get them, how much they would cost, or how quickly they could be obtained. It would save this and other training staffs of any type a great deal of effort and decision-making time if this information were readily available in a public, systematic way.

In the availability of materials, AIR had no problems, once they were identified. We found easy access to all materials which were noted as being crucial or desirable for the curriculum. The ease with which these materials were obtained might be a weak spot in the model, but certainly not something which cannot be accommodated at other sites. AIR is fortunate in having a sizable in-house library of 1,600 books; 5,300 research reports; and subscriptions to more than 350 journals. In addition, it maintains two full-time librarians to serve staff research needs. Obviously, not every agency has this capability in the very same building. To supplement this already rich source, the AIR library maintains an official, professional affiliation with all Stanford Libraries. If a reference is not stored at AIR, it is readily available from Stanford. In the sense of accessibility of materials, AIR has particular advantages.

However, nothing was unique about the materials themselves. They are well known and nationally available. The implications for the replica-

tion of the model are that other host institutions need to a) have or be near major, comprehensive libraries which are likely to be rich in education-related documents, or b) prior to the start of any training program, stock up on documents, journals, books and so forth which it thinks it might utilize. AIR's situation allowed for almost spontaneous retrieval of materials. Agencies which do not have this capability could certainly get the same materials, but it would have to be a more studied effort, allowing considerable lead-time.

There is one additional point on materials. We did not have six copies of all documents, and sometimes they were needed. Should a program be even larger in scale, it might be difficult to get dozens of copies of everything. Even in this day of Xeroxing, it is not feasible to make multiple copies of a whole book, besides being illegal in most cases. Therefore, while this small program could accommodate a passing back and forth of materials, future programs should institute a rather formal library system. There are times when all trainees of a program would like to or need to look at some document or book at the same time, in spite of the fact that the program is individualized. In most instances, it is just not possible to have one copy of everything for everybody. Some system such as "overnight loans" would be recommended for future replications. We did not think six trainees would call for such a system, but there was a surprising demand for one. Informal communications were not totally adequate in answering questions of what was available or who had what research report and when it would be back.

The apprenticeship component

In terms of exportability, the apprenticeship component has the same dependency on the particular agency and individual characteristics as does the staff portion of the instructional component. What takes place in an apprenticeship depends on the combination of individual trainee interest and/or expertise, and what is ongoing at the agency. However, again, any relatively large, well established agency engaged in educational research and development would be able to make diverse offerings for apprenticeship activities.

Therefore, while agency activities may provide some substantive boundaries to apprenticeship experiences, there are many common threads to the activities in all the potentially viable host institutions. What the apprentices experienced at AIR could be found at any number of other diverse research houses or agencies. The major modification would be found in the redirection of general apprenticeship activities toward specific projects within the agency. Thus, the apprenticeship component is highly exportable, although the partial definition of specific activities depends on the nature of the efforts within each research agency at the time of the training program.

The job placement component

The fourth component, job placement, is highly exportable and generalizable as a concept and an activity. There were four major directions to job placement efforts. The first of these drew upon AIR itself as a potential employer, and AIR staff members' contacts with individuals in other agencies and organizations. While this phase had a direct bearing on AIR as the host institution, it is not necessarily unique to AIR. Any sizable research house is likely to offer the same potential opportunities, and its staff is likely to have personal contacts in a variety of other R&D organizations. In this sense, what was being taken advantage of was the R&D "fraternity," and this could be utilized at any site active in educational R&D.

The second major direction of job placement activities was to keep abreast of the recipients of new contracts. This was done through an AIR in-house newsletter, Behavior Today, Review of Educational Research, and newspapers. The last three are publicly available documents which could be used at any site. The point here would be to contact these recipients of new contracts on the possibility that they would need additional staff members.

The third job seeking effort was to encourage trainees to review the possibilities of their own contacts, such as relatives, neighbors, and so forth, who might be involved in education, educational R&D, or some related field.

The fourth effort was the most traditional. Standard sources which posted job openings were examined regularly. These included the APA Employment Bulletin, the Educational Researcher, and civil service listings. In addition, resumes were sent "blind" to logical employers such as the Educational Laboratories.

Of these four directions, the one which seemed to have the most substance, was personal contacts through AIR. The educational R&D "fraternity" was more receptive and seemed to offer more solid leads than any of the other types of efforts. This, however, is not unique to this program or employment seeking in general. It is widely acknowledged that in any type of job seeking activity, a personal reference or professional contact is usually more fruitful than just "knocking on the door."

Surprisingly barren sources were the public listings, such as those of the APA Employment Bulletin. There were a few academic listings for university teaching jobs, and the like, almost none in educational R&D, and the offerings in general were very sparse. Again, this might have been an indicator of the relatively thin economic situation at the time.

In summary, none of these efforts was unique to AIR, its location or its staff. While the personal contacts were certainly defined by the people who happened to be known, this procedure is not unique. In any setting

associations could and should be drawn on, for they appear to be viable sources. All of the other efforts are obviously public and could be utilized by any resourceful job seeker anywhere in the country.

Comment

A manual has been developed by the AIR staff to assist other institutions to replicate or modify the program of this study. (Millstein, E., Melnotte, J., and Dunn, J., Procedures for Conducting an Apprenticeship Work-Study Program, Palo Alto: American Institutes for Research, 1972. Prepared under Office of Education Grant No. OEG-0-71-4712.)

It offers descriptions and guidelines for the conduct of the four components of the model. In addition, specific aids are included, such as instructional objectives, instructional resources and materials, samples of newspaper advertisements, press releases, letters of rejection and acceptance, an information booklet, and so forth.

D. *What is the trainee reaction to the program experience?*

Findings

In general, the trainees were very pleased with the program and the opportunity. As one trainee said, "The thirteen weeks was a most welcome opportunity to think deeply about education." All of the trainees felt they knew more about educational R&D than they did before the start of the program. The pre- and post-test results, and the detailed self-report on specific objectives attainment verify this growth in knowledge about education and growth in performance levels on tasks associated with educational R&D.

However, interestingly enough, most seemed to agree that they could perform the general tasks required for educational R&D before the start of the program, in spite of these indicators to the contrary. They perceived that the basic issue was problem solving, that they had been problem solvers in their past jobs, and that all that was now required was familiarity with a new field. What the program gave to them was not so much new skills as a different orientation. This view was strongly felt by all the trainees and is the most basic statement to be made of trainee reaction to the program experience. This was happily greeted by the project staff. The training program was not intended to teach new skills, but rather to transfer old skills to a new setting. The trainee reaction to the program, then, was very much in accord with the original philosophy of the program.

There were a number of specific points to which the trainees had an opportunity to react on the final trainee survey. These were:

(1) Would you have desired more or less structure in terms of readings, formal seminars, or other types of directed study?

(2) Would you have desired more mandatory activities, deadlines, etc.?

(3) Do you feel you could or should have started on apprenticeships the first few days of the program?

Examples of reactions to these issues are quoted below.

*(1) Would you have desired more or less structure in terms of readings, formal seminars, or other types of directed study?

"Just right as it was."

"Preference for much more structure regarding readings and discussions, but in terms of independent study, . . . no."

"More structure for a shorter time."

*(2) Would you have desired more mandatory activities, deadlines, etc.?

"No."

"I do not feel that there is a necessity for more mandatory activities."

"No, except seminars on significant educational research topics."

"The degree of structure was satisfactory."

"Yes."

*(3) Do you feel you could or should have started on apprenticeships the first few days of the program?

"I could have done so, but felt it was desirable to delay apprenticeship work, in part the way it was done."

"I do not feel that apprenticeship should be started in the first few days, but that emphasis should be on a more highly structured orientation."

"No."

"That would be a very feasible approach for some people."

Discussion

Degree of structure

As is obvious, individual reactions to specifics of the program differed with individuals. One trainee seemed fairly uncomfortable with independent study which was individualized, and would have desired a much more school-like setting. Others seemed fairly secure with this kind of approach. Still another trainee was comfortable with the approach, but probably would have been more industrious in a more structured setting. It is difficult, if not impossible, to predict a trainee's demand for structure from any application information, including the interview.

All trainees were chosen because they appeared to be able to function com-

fortably in a varied, but individualized setting, which required personal initiative, motivation, and judgment. An apprenticeship of this type in any work setting, is not equipped to do a great deal of "hand-holding." While it is highly desirable that trainees be willing to function in a highly independent manner, there seems to be no way to predict this in the selection process as employed, short of their personal expression, and this expression may not always be valid.

Reading and study load

Many of the trainees found the reading load to be quite heavy. As one pointed out, "It takes a great deal of personal discipline." However, this was not considered a great stumbling block, but rather a matter of adjustment. The majority of trainees either did not read a great deal in their past jobs, or had been unemployed for some time, where reading was done occasionally for leisure. The heavy reading and study load appeared to cause some discomfort. Again, this cannot be predicted from initial information. Almost anyone involved in educational research and development needs to be very comfortable with a lot of reading, writing, and, in general, verbal activities. It is difficult to screen out those who might be uncomfortable, but perhaps self-screening could be enhanced if the desirability of these skills was stressed in pre-application information.

Future employment

Another major reaction to the program experience dealt with job-seeking and job location activities. This was discussed in a previous section, but it is appropriate here as well. It is probably safe to say that the trainees were disappointed that there were not a tremendous number of jobs available from which to select, or that AIR did not actually get all of them jobs. This could probably be classified as the major disappointment of the program. It was stressed very early on that jobs would not be promised, were not part of the program, but that assistance would be offered. This was done. However, it is perceived that more optimism for jobs and more dependence on AIR was generated through program membership than was justified.

The program staff felt that the possibility that jobs for trainees might not be obtained was well reinforced. However, perhaps it should be stressed even more in future programs, particularly when certain individuals are not being trained for certain pre-identified job slots. These were unemployed persons looking for new opportunities. That a new opportunity will actually be realized cannot be guaranteed in a program of this type.

E. *What should be the content and procedures for follow-up?*

The purpose of follow-up is obviously to find out what became of trainees once they had left the program and had gone their separate ways. Of special interest, of course, is whether or not they located jobs in educational R&D, and if not, whether they were still pursuing jobs in educational R&D. Unemployment here becomes a rather special factor. It would not be surprising if trainees pursued all jobs, whether they were in education or not. It would be quite excusable if they returned to their old fields, or just sought any kind of job, for the sake of temporary employment. However, persistance in seeking educational R&D jobs would be one indicator of genuine interest in education, and success in locating positions would be an indicator of the degree to which the program creates a product with credibility and a "product" who functions comfortably in the new situation.

The follow-up inquiry was conducted seven to eight weeks after termination of the formal program. There were six key questions of interest:

(a) Have you sought jobs in educational research and development?

(b) Who or what types of agencies have you contacted?

(c) What have been your successes?

(d) If you were turned down for a job or job interview, were you ever told why?

(e) If you obtained employment in educational R&D, what have been your senses of satisfaction, confidence, and interest?

(f) To what extent did membership in the program make a difference?

Because of the small number of trainees, it was feasible to conduct this inquiry by telephone and record the major responses during the interview. If a larger pool is involved, it would be entirely reasonable to administer the questionnaire by mail. For those who would not respond by mail, a telephone inquiry would then be appropriate and feasible.

This follow-up resulted in a variety of responses, even with a trainee group numbering only six. As indicated in a previous section, two trainees were permanently employed in educational R&D, one was rehired at his previous place of employment, and the other two trainees were still out of work.

At the time the latter two were contacted, one had elected to not heavily engage in job-seeking activity at the present time due to illness in the

family. This particular trainee was from Seattle where unemployment benefits have recently been extended three months due to additional Federal support. This trainee felt that these extended benefits allowed for attention to more immediate non-work related problems, but felt that once they were resolved, job-seeking activity in educational R&D would resume. There had been no response as yet to applications for employment submitted during and immediately after the program.

The other still unemployed trainee felt admittedly disillusioned that the program had not done more for him. It was felt that the job market must be particularly tight since it was difficult to even get an interview for any kind of job, and association with the program did not seem to enhance this for job inquiries even in firms whose activities were education related. This trainee expressed feelings of being caught in the middle. If jobs were sought in engineering, it seemed that interest in education, exhibited by being in the program, made eligibility and interest in engineering jobs suspect. On the other hand, a strong engineering background made interest in education seem suspect, in spite of having been in the program. There appeared to be quite a strong feeling that program participation was as much of a hindrance as a help, and that furthermore, not enough follow-up effort was made on the part of the program staff to set up post-program interviews.

This disappointed view did not seem to be shared by any of the other trainees. As mentioned, the other trainee who was still out of work was not seeking work. The trainee who had been temporarily employed in educational R&D was not now working, but also stated that there were not strong efforts directed toward job-seeking. Considerable effort, however, had been expended during the month of January. About fifteen organizations with educational R&D activities had been sent resumes. Most of these contacts were suggested by the survey list of educational R&D employers constructed by Far West Laboratories. As of mid-February, the trainee had received about six negative replies and one positive offer in Florida. Efforts at job-seeking had slowed somewhat due to a decision to switch graduate programs from an M.S. in Psychology to an M.S. in Educational Psychology. The necessary courses in the transfer would begin in the early summer, so that job decisions might be delayed until after that program was complete.

Three of the trainees are currently employed. The one who was rehired at Boeing is still in his old position and feels relatively secure. The statement was made during the interview that the program at AIR was highly enjoyable and that work in education was most attractive. It was deemed regrettable to have to leave the program, but it was felt that the opportunity for certain employment had to be taken when it was offered.

The other two employed trainees are now in work related to education. Both are extremely satisfied with their jobs. One in particular feels that the work is varied, that he has considerable mobility in his immedi-

ate environment, and very much enjoys the people with whom he is working. He feels that the work being done and the environment he is in are not totally strange, and that the program contributed to these feelings of confidence and familiarity. In addition, the program was given credit as contributing a considerable degree to his credibility in obtaining the job contact and in getting his job. While he could perform his job to a certain degree without the program, the actual experience of the program offered him considerably more "savvy" about education than he might otherwise have had. It was not a matter of learning the job from the ground up with or without the program, but the program enhanced a quick and easy transfer of his skills from one work environment to another.

All of the trainees had received rejections to their applications in one form or another. In every case, those rejections consisted of obvious variations of form letters. Comments such as, "We have reviewed your application and were impressed with your qualifications, but . . ." were quite common. In no case could it be determined exactly why a trainee was not interviewed or not hired. However, a number of letters did state that the organizations simply were not hiring at this time. Given the current economic health of education, this could well be the case.

These follow-up procedures worked very nicely with this group of trainees. Each telephone interview averaged ten to fifteen minutes and considerable information was gathered. The questions seemed appropriate, to the point, and answerable. As to the timing of follow-up, anywhere from four to six weeks after termination of the program would seem the most fruitful. Time periods shorter than this do not really allow for placement activities to offer stable results; and in a longer time frame, trainees are likely to lose contact and identification with the program.

These procedures, or variations of the same procedures, are adaptable and highly recommended for future programs.

F. *How responsive is the manpower pool?*

Background discussion

Two basic strategies were employed to make the program's existence known to the potential manpower pool. These included the placement of an ad and a press release in key newspapers and a public posting of the program in Seattle and Bay Area Employment Service Offices. In both these areas, there are a large number of major and minor newspapers, trade papers, ethnic papers, and so forth. Since there were not the funds and, perhaps, not the necessity, to place the ad and press release in all papers, decisions needed to be made about which of the myriad of sources would be most relevant. This was particularly true of the ad, where money was a factor. These decisions were based on three considerations: 1) audited circulation of the newspaper; 2) proximity to the likely pocket of unemployed aerospace personnel; and 3) local notoriety that the paper's classified section was a popular reference for job-seekers. Based on these combined factors, the ad was placed in The Seattle Times (Thursday and Sunday editions), The San Jose Mercury-News (Sunday edition) and the joint classified section of The San Francisco Examiner and The San Francisco Chronicle (Thursday edition).

A press release was also issued to these and other regional newspapers. These included The Seattle Post-Intelligencer, The Seattle Times, The Tacoma News-Tribune, The San Franciso Chroncle, The San Francisco Examiner, The Oakland Tribune, The Palo Alto Times, and The San Jose Mercury-News. The press release, however, is not a reliable news dissemination vehicle, because the person who issues the release has no power or control over whether or not the paper will print it. In addition, even if the release is printed, it is likely to have been edited, which may or may not change the flavor of the message. Therefore, primary reliance for getting responses was placed on the ad, and secondary reliance on the Employment Service posting.

Persons who saw the ad or posting were then to make telephone contact with either our Seattle representatives at the University of Washington or with AIR directly. This, of course, depended on where the potential applicant lived. The purpose of the call was for each potential applicant to get additional information and to then request an application form if the program still seemed attractive to him. Without some sort of defined time period for responding, calls could obviously come in for quite a number of days or even weeks. Therefore, the formal publicized response period was established at three days for each site.

Initial response results

Before and during the establishment of this process, there was absolutely no way to predict what the response would be. However, it seemed a logical

process, and our guesses were that the response would be substantial, but we had no way of knowing for sure.

The results were as follows:

Number of initial calls in response to the ads and Employment Service postings	Seattle	Bay Area	Total
	168	114	282

Given the minimal recruiting efforts of a simple newspaper ad and an informational posting in unemployment offices, this response is considered substantial. This is especially true in light of the fact that the ad contained sufficient information to pre-screen many potential applicants on a self-select basis. In addition, had any more calls been received during that time period, they simply could not have been handled. Given a full work day, calls were received at an average rate of one every seven minutes in Seattle and one every eleven minutes in Palo Alto. By the time information was exchanged, addresses taken, and so forth, the phone was ringing again. In fact, it would have been difficult to handle many more calls in that time period without expanded reception facilities. The two telephone lines in Seattle were in almost constant use, and the switchboard at AIR was extremely busy.

It would be logical that since the program was based in the Bay Area, and since the Bay Area has over three times the population of the Seattle area, there would have been more Bay Area inquiries. As indicated, this was not the case. One explanation might be that Seattle had, and still does have, a more severe unemployment situation. The Bay Area has a considerably more diverse employment market than Seattle, which is heavily involved in aerospace as a total community. This difference was reflected in their respective unemployment rates: as of June 1, 1971, the Seattle unemployment rate was 13.9%, while the rate for Santa Clara County (center of Bay Area aerospace activities) was 6.3%. This difference is no doubt reflected in the relative number of calls received in the two areas.

Interested inquiries

The next point to be examined was whether or not callers were still interested in receiving an application after hearing more information about the program, particularly with reference to money. While the ad gave considerable information, it intentionally omitted any reference to the stipend. The reason for this was to determine whether the very modest amount discouraged further interest, which would be exhibited by not requesting an application.

The results of this inquiry were:

	Seattle	Bay Area	Total
The number of inquirers who requested or were sent the application and fact booklet after the brief telephone contact	168	102	270
Percent of initial number of inquiries	100%	90%	96%

Strangely enough, the issue of money was very much in the background. Out of 282 calls, only one person decided not to pursue application because of the small stipend. In addition, the Bay Area figure is somewhat misleading. While 102 applications were requested from a total of 114 original inquiries, 10 of that difference of 12 were due to non-eligibility. For the most part, they were people who knew they were not eligible from information in the ad, but were trying nonetheless. These included teachers, persons without degrees, and so forth. Therefore, out of 282 initial inquiries, only 2 elected not to pursue further application procedures given the additional information. Of these two, one opted out because of the modest stipend, as indicated, and the other would not say why there was disinterest. Therefore, the real response percentage at this stage was 99%, rather than 96%, a substantial figure, indeed.

Number of applicants

At this point, the initial call rate was known, and the number of persons still interested enough to obtain an application was also known. The next stage was to examine the number of persons who actually followed through on submitting the application. This, perhaps, was considered the real test of interest in the potential manpower pool, for along with the application was sent a fact booklet which discussed all the salient points of the program in question and answer format. (The contents of that booklet are offered in Appendix I of the companion final report on the program itself.)

The results were:

	Seattle	Bay Area	Total
Number who actually returned the application	102	73	175
Percent of those who had received applications	61%	72%	65%

It is difficult to state what percentages would represent "overwhelming" response, "moderate" response, etc., since there is no precedent for comparison. However, the facts that no more initial calls could have been

comfortably handled, that almost 10 out of 10 persons who initially inquired chose to receive an application, and that approximately 6.5 of those 10 actually followed through with submitting the application all point to what might be labeled extremely strong response. When only 6 of 175 applicants could be selected, there was certainly no shortage in the numbers of persons from whom selection was to be made.

Women applicants

Of special interest during this recruitment process was the number of women who applied. These results were as follows:

		Seattle	Bay Area	Total
Numbers of male and female applicants	Male	96	70	166
	Female	6	3	9
Percent of female applicants		5.9%	4.1%	5.1%

Strong affirmative action was taken to secure female applicants. However, applications from females accounted for only 5.9% of the Seattle pool, 4.1% of the Bay Area pool, and 5.1% of the total.

Data on the total female market, unemployed due to aerospace cutbacks in the two regions, were not readily available. However, in an attempt to make some judgment about these proportions of female respondents, the Santa Clara County Unemployment Office was contacted, and they agreed to summarize the data from their files. As of August 23, 1971, they had registered 662 engineers, scientists and technicians who had been laid off from companies involved in aerospace. Of these, only 5, or less than 1%, were females. If it is inferred that those figures are representative of the relative size of the male and female markets available in Santa Clara County, and perhaps, other counties, then the 4% or 5% female application response exceeds expectations.

As a side comment, it might be mentioned that the nine females who did respond were all relatively strong candidates, and as a group, more homogeneously strong than were the men. If a statistical analogy might be made, the females had a generally higher "mean" and a smaller "standard deviation" than did the males as a group. However, there are the obvious weaknesses of comparing groups of 166 and 9 respectively. These are only intended to be preliminary observations.

In summary, then, the manpower pool was very responsive, and the vehicle of a newspaper advertisement to publicize the program was most effective. It should be kept in mind, however, that the want ad section of the newspaper was particularly appropriate for a target audience of unemployed aerospace personnel. A different audience would require different techniques and different sources. As an obvious generalization, the vehicles for information dissemination need to be tailor-made for the particular group of trainees desired. Key questions would include "Where are they most likely to read or hear about our program," and "What are the most likely sources for contact." Given the audience in this particular case, newspaper want ads and Employment Service offices were highly logical sources and highly effective sources.

G. *What procedures should be followed for the selection of trainees?*

In summary, the selection steps were as follows: a) the screening for eligibility and rating on a five point scale the 102 applications from the Seattle area and the 73 applications from the Bay Area; b) selecting the top-rated applications which numbered about two dozen from both areas; c) the contacting of those top-rated applicants to come to either the University of Washington in Seattle or AIR in Palo Alto for additional screening; d) administering an educational areas test and obtaining a writing sample from the top-rated applicants in each area; e) scoring the test and the writing sample; f) selecting the top dozen from each area for personal interviews; g) conducting interviews; h) selecting the top six from each area on the basis of cumulative information; i) review and ranking of the top six from each area by AIR program directors; and j) final identification of the three from each area selected for the program, plus three alternates from each area.

This general paradigm of application, testing, and interviewing represents three screening stages, each with finer decision-making delineation. There were four major decision steps, i.e., 1) toward what population will the applications be aimed? 2) of those applications, who will be selected for further testing? 3) based on applications and test results, who will be selected for interviewing? and 4) who will be selected for the program? Only the first of these was pre-defined by the very nature and intent of the program. The decision had already been made to conduct the program for unemployed aerospace personnel. However, the other three decision stages had to be and were conducted in their various appropriate time frames as the results of the selection process required more and more refinement.

This general paradigm was, perhaps, quite traditional, but it was also efficient. A great deal of data were processed, and decisions on that data were made in a fairly short period of time. The judges consisted of program staff in the early stages of the process, and program staff plus AIR program directors at the later stages of the process. There were no major rating discrepancies between and among judges at any of the stages. This was particularly true of the initial steps of the application review where independent ratings were made on each of the 175 applications. There was a somewhat lesser degree of agreement only at the final stage of selecting the trainees from those interviewed, and even these were not gross disagreements. The staff would have been comfortable with most of those interviewed: the issue was how to select the best, from an already agreed upon, good pool.

It was found that the rating and test data provided fairly natural breaking points. It may have been serendiptous, but these points nicely accommodated the original notion of testing the top two dozen from each area, interviewing the top dozen, and selecting three trainees, with three alternates from each area. In summary, the general paradigm was considered

appropriate and successful, although not necessarily unique. The selection process was efficient, smooth, and fairly natural.

Application

As is true in any endeavor of this type, certain points of the selection process provided more information than others. The application was a major source of information and the staff would be more than willing to use it again. The major weaknesses were in the area of credibility on such issues as genuine interest in educational R&D, acceptable salary, and willingness to relocate. But these are issues in any case, no matter what inquiry techniques are used.

Writing sample

The writing sample was a more than reasonable screening device, given its pervasiveness in educational R&D. However, in this situation the degree to which pressure affected quality is indeterminant. One factor which may have played a role is that the question was pre-determined, applied to all candidates, and was fairly specific. This was deemed desirable for purposes of standardization and consistency. However, in order that content not confound style and organization of thought, which are the real issues, it is recommended that the topic on which a condidate writes be somewhat less structured.

Test

The ETS test did offer a good distribution of test scores, and it did play a role, along with the writing sample, in who would be interviewed. However, there were yet to be answered questions about the role of tests specifically aimed at educational areas in trainee selection, and whether this particular test was most appropriate. It is asserted that the test was general enough in nature that a reasonably involved, reasonably intelligent, reasonably well read person could perform adequately on the test, whether or not his past experience involved educational issues and information. It is true that trainees did exhibit stronger performance on the post-program administration of the same test. However, this is quite a different issue as to whether or not it is desirable in the selection phase of the program.

However, some objective screening device is desirable, if only to give program staff some common, well known, acknowledged reference points. At issue is the extent to which that test needs to be specifically associated with education or whether some other type of measure would suffice. This

issue is further discussed Section J, but in summary, it is now felt that any general instrument which assesses the ability to function effectively in a verbally oriented learning environment would suffice just as well, and perhaps even better. The generalized portion of the Graduate Record Examination, College Entrance Examinations, or the like, are good examples. The fact that a trainee have a strong pre-program knowledge of education does not seem to be crucial. It would seem far more important that the trainee be adaptable and more than reasonably bright, no matter what the area of expertise.

Interview

The interview is the most interesting and enlightening component of the selection process. If a program had the time and money, it might be fruitful to interview all potential trainees, save the obviously unqualified. One problem with interviews is that they can be misleading: an "interview-wise" candidate can offer a variety of socially acceptable responses which may or may not be a true representation of actual position. The interview process in this program's selection was usually conducted by one person, with one interviewee, and was fairly structured. There are two recommendations which might now be made. Firstly, the interview should be conducted by more than one person, which might roughly be labeled a panel. The early stages of the interview should be highly structured and conducted around very specific questions. The latter stages of the interview should be unstructured with the questions or topics emanating from responses in the structured portions of the interview. This process was very much like that utilized in this program. However, it was felt that more than one interviewer would reduce errors of judgment and could made additional, solid inputs for information gathering. In general, there was more confidence in a consensus opinion than a single opinion.

A second recommendation, although perhaps not as realistic, is that there be some sort of mass interviewing of all potential trainees with all senior program staff. This process has the appearance of an unstructured discussion group, but is, in reality, quite structured. The Rhodes Scholar Selection Committee has applied this technique and found it to be quite successful. It has the advantages of efficiency in time, the provision of more life-like and work-like settings, and minimizes the impact or import of individual errors of judgment. The disadvantages are that it requires a great deal of time and sophistication to set up such a studied, calculated interview, with none of the apparent characteristics of a studied, calculated interview. In addition, it can be expensive, for such techniques usually require a degree of social entertaining.

Therefore, while the latter approach is attractive, it is perhaps not feasible and not worth the effort and money for short-term, relatively small scale programs. Therefore, the most realistic recommendation at this time

is that of the panel interview as described.

In summary, the application process was effective as designed, the writing sample should be more individually selected, the testing phase could be in more generalized areas, and the interview stage should involve more than one staff member. What was done was by no means deemed to be ineffective, or to have lead to inappropriate decisions; but the changes in the selection process, as recommended, are considered to potentially contribute to easier decisions with a greater degree of confidence.

H. *What are the implications to the host institution in conducting an apprenticeship training program?*

Trainee presence

Senior staff who had had contact with the trainees were periodically interviewed to assess the degree to which performance of, and interaction with, the trainees had been satisfactory. An important concern before the program began was the extent to which the presence of six relatively naive strangers, working throughout AIR, would interfere with established routines, require an inordinate amount of supervisory and explanatory time, and generally be disruptive to an ongoing, efficient work pattern. In general, these fears did not materialize. In no way did the staff feel that the trainees were an intrusion. Comments included, "they seem to be adult and independent workers," "having people around with different backgrounds is refreshing," and "they reinforce my tutorial inclinations."

On the other hand, while the trainees were by no means an intrusion, neither were they a strong professional advantage. It was originally felt before the program started that having six technically and professionally competent additions to the working environment would provide the impetus for new, fresh ideas, new ways of approaching old problems, and perhaps new techniques and processes. It was felt that we might learn something new about processes and problem solving in the physical sciences which could be advantageously adapted to the behavioral sciences. However, this did not seem to materialize. From an AIR point of view, one, maybe two, trainees brought new skills and new ideas to educational R&D. The other trainees were akin to junior staff members already in educational R&D. It is, of course, entirely possible that the specific apprenticeship activities and the relatively short duration of the program did not allow the manifestation or maturation of potentially valuable inputs. But, given the fairly short time span of the program, it can be observed that having been in the physical sciences, having performed different tasks in a different environment, did not seem to make a startling difference in professional contributions to education. Many of the trainees did, in fact, feel that "work was very similar--it was just done in a different area." As a general statement, the degreee of creative innovation provided by professionals from a different field did not meet expectations. While new ideas and approaches were certainly offered, they seemed to be more functions of the individual person rather than their particular work experience. These people would be likely to bring creativity and industriousness to any setting. The mere fact of having the opportunity to reapply old skills to a new area does not necessarily result in new contributions.

Therefore, the host institution which expects a great influx of potent manpower for a limited period of time in the conduct of such a program, simply cannot count on it. As in any work situation, in any field, it is still a matter of personal contribution. Perhaps it could be stated that "work is work," and individual contributions are made in individual settings.

Therefore, while the trainees were by no means an intrusion, neither were they a great professional advantage.

Staff commitments

A minor problem area is the degree to which staff in the host institution, who are not directly involved with the training program, can be drawn upon to give seminars, lectures, administrative time, and so forth. For example, the AIR staff provided a rich resource for professional guidance and expertise, but time was at a premium. A large number of staff did make contributions to the program, but these contributions were in addition to an already heavy work load. The issue is not money. That is, it would make no difference if outside-program staff within the institution were paid as "consultants" to conduct a seminar, for example. A budget provision for these areas would not resolve the problem. The problem is one of time. In most of the host institutions, staff would be very committed to conducting their work on other contracts or projects. To conduct a one-hour seminar probably takes at least four to eight hours preparation time. When there are many other commitments and deadlines to meet, this much time can be quite demanding.

The situation is certainly not impossible, however. In-house expertise is highly desirable and even necessary to programs of this type. The program at AIR did not meet with many difficulties: staff were willing and happy to participate. But there are a number of prerequisites which pave the way for cooperation. First, outside staff need to know the purpose of the program and understand the role of the host institution in conducting the program. Secondly, they need to know why they, as individuals, are needed to discuss their particular area of expertise. And thirdly, they need a reasonable amount of lead-time. These seem to be common sense fiats, but they are very basic. In all but the extreme cases, these procedures should enhance willing cooperation and enthusiastic participation in the program. In the case of AIR, staff who were brought in to participate in the program felt that it was a happy and worthwhile venture.

Administrative considerations

General administrative procedures proved to be of little trouble for the host institution. These administrative procedures included such tasks as registering trainee Social Security numbers, arranging for payments of stipends, finding desks and office space, and the like. While it took a bit of time for the immediate program staff, it was certainly relatively minor. AIR has a well developed system of office services and accounting which contributed to the ease with which these tasks were accomplished. This would no doubt be true of any established organization.

I. *What are effective procedures for the monitoring of trainee progress?*

Need for documentation

First and foremost on this issue, not enough can be said for documentation. Trainees need to record and formally submit their activities and reactions, and staff need to maintain records of assignments, known trainee activities, personal reactions, and reactions of staff members who are not officially participating in the program, but who have had contact with the program. It is a very sobering thought that some programs might be conducted without such documentation. Not all of what transpired could be mentally stored and recollected by one or even half a dozen persons, even on a weekly basis. In order to be fully aware of the dynamics and activities of any program of this type, there needs to be an almost daily accounting of events and observations. This was done by both the director of the training program and the director of evaluation. "Keeping track" is vital, and cannot be successfully accomplished without persistant attention and formal recording.

Approaches to monitoring

Three major recording approaches were employed, and they proved to be highly successful. The responsibility for two of these approaches lay with the immediate project staff.

First, the director of the program and the director of evaluation of the program maintained personal daily "diaries." These included notations of trainee assignments and accomplishments, staff meetings, and even personal affect to events of the day.

Secondly, these two staff members recorded all interviews with outside-program AIR staff who were interacting with the trainees, and with the trainees themselves. These two processes provided an excellent, comprehensive overview of what had transpired over the thirteen-week period. Without such documentation, it would have been impossible to maintain a realistic picture of perceived progress, with all its nuances of change and growth.

The particular technique involved in this area was fairly structured. The director of the program made a point of interviewing each trainee twice weekly. The intent of these meetings was to determine progress to date, determine future objectives, suggest possible strategies to meet those objectives, and register various areas of satisfaction or difficulty. This sort of information gathering required a great deal of time and personal attention from the project director. Since this project involved only six persons, this extensive degree of personal attention was feasible. However, programs on a much larger scale could not employ quite the same approach.

There would have to be either 1) more staff members involved in such personal, individualized contact, 2) one person whose only task was to monitor progress and discuss activities with the trainees, or 3) some system which employed an "ombudsman," to whom trainees could turn for the resolution of particular problems or the reception of new tasks. Of these three, the second is probably the most viable. Monitoring progress of a sizable number of trainees could be a full-time task. In addition, there would be the advantages of having a central resource person who was aware of the total situation, and the provision of something more than just informal, occasional contact when there were problems. Additional staff members involved in this task could make for disparate communications and an ombudsman would have an unpredictable and undefined work load.

In summary, personal monitoring is of high necessity. If a program is small, the project director could probably handle it satisfactorily. If a program is large, there would need to be a special position of some sort.

The third recording approach was the responsibility of the trainees and also proved to be highly successful. During the first days of the training program, it was announced that trainees would be required to keep an individual daily chronicle of events--what they did that day, with whom they talked, what they read, their pleasures and disappointments. These documents, referred to as "logs," were turned in each Monday morning to the director of evaluation for review and summary. The logs provided an invaluable and unique source of information on each trainee's activities and academic pursuits. It was an obvious monitoring device as to the meeting of assignments and the identification of individual efforts at following up expressed areas of interest. Since each trainee maintained the log on a daily basis and accumulated them, it provided each trainee with a personal view of progress. In addition, since the logs were also summarized and annotated by the program staff, it served as the basis for a cumulative file on each trainee.

The format of these logs was an interesting point for decision. During the first half of the program, the logs were very "open-ended." Trainees were simply asked to record their activities and reactions in any form which was comfortable. Obviously, these logs were mostly of the essay type and varied considerably as to the information they provided. Some trainees seemed to have considerable difficulty expressing affect. Either they did not know in what areas there was interest in their reactions or they did not know how to express them. At the midpoint of the program, an alternate approach to "log keeping" was instituted. The new format minimized open-ended responses and maximized the specificity of desired information. However, the opportunity for "comments" was maintained and encouraged.

The new format defined the areas of response through specific questions. They were:

(1) Apprenticeship activities? (What? For whom? When?)

(2) AIR staff contacts and general purpose of meeting?
(3) Readings? (Please indicate whether related to (a) modules or other assignments, (b) apprenticeship activites, (c) personal follow-up on a topic of interest.)
(4) Job search activites? (sources identified, resumes updated, letters sent, interviews set up, outcomes, etc.)
(5) Transfer skills and new skills which would be attractive to potential educational R&D employers?
(6) Comments (e.g., suggestions for program, accessibility of materials, reactions to apprenticeship activities, etc.)

It was felt that the old, "looser" format might not be amenable to gathering the desired information. Trainees generally seemed uncomfortable with it and relatively insecure about what to record. In the monitoring of the logs, it was felt that the information offered in the loose format was fairly substantial, although the trainees needed a good deal of encouragement to express personal reactions to events.

It was deemed that the new, directed format would provide an even richer source of information, since the communication of desired information seemed so clear. However, it did not turn out that way. The new format resulted in amazingly restricted documentation. Those who had been quite verbal under the old format now gave rather cursory answers to the specific questions. Those who had been terse in the first place found the new format an opportunity to be even more terse. Therefore, it is highly recommended that the form of future personal documentation by the trainees follow the format originally employed in the program; that is, open-ended and relatively free flowing. Verbal guides were, of course, initially offered, but after that it seemed more fruitful to allow the trainee to offer expressions of events which seemed most personally important, plus some attention to the verbal guidelines offered by staff. It might be feared that under these conditions, program monitors would not get the information they needed, but this did not seem to be the case.

In summary then, personal contact in monitoring trainee progress seems a must. It is quite time consuming, but future programs should provide for that. In addition, careful attention to documentation is also a must, both from the trainee viewpoint and the staff viewpoint. To rely on memory and casual month-to-month judgment would be entirely insufficient. There are just too many factors which need recording to support such a casual approach.

J. *What is the role of traditional tests in trainee selection and assessment?*

One observation which is not new to educational research and development is the relative remoteness between the content of tests on educational topics and the actual tasks performed in educational R&D. The latter aspect has and is receiving a great deal of attention through such activities as the AERA task force on R&D skills, the Oregon Study group, and related efforts at the Far West Laboratory. The AERA effort to develop criterion-referenced measures to reflect tasks is even newer.

It is still a moot point as to what an entry-level educational R&D worker needs to know about classical topics in education in order to function effectively on the job. During the selection process and at the beginning of the program, we were caught up in the academic tradition of the necessity for test giving in the educational area. But as the program progressed and the work activities were observed, one could not help but note the disparity between, say, "Deweyan Concepts" and getting a proposal written, organized, typed, and submitted. There is no doubt that some basic knowledge of definitions, approaches, and concepts is necessary, if only from a communications standpoint. But the degree to which these are formally or informally taught, their cruciality to successful performance on the job, their relationship to specific kinds of jobs, the stage at which they should be taught, and when and how they should be measured are all in question.

From this program, it might be observed that effective functioning in an R&D setting has much more to do with general personal competencies than with any particular knowledge of education. These could, of course, well be correlated for any variety of reasons, but it is strongly felt that any bright, creative, industrious, well-motivated worker could make strong contributions to education, whether or not that worker knows a great deal about classical educational topics. This is not to say that test-giving itself is inappropriate, but rather that tests in education, per se, are not necessarily valid predictors for effective workers in educational R&D.

As indicated in the Introduction, educational R&D has become a very eclectic field which encompasses far more areas of expertise than just knowledge of education. In selection and assessment, then, tests may very well be employed, but those tests should probably more appropriately reflect general competencies, the ability to solve problems creatively and flexibly, and general comfort in a verbally oriented environment. To solely employ a test of educational areas would not be an adequate reflection of what it takes to be a productive worker in educational research and development.

Much of the previous discussion has dealt mostly with the use of tests in the selection of program participants. In terms of assessment, given some sort of training, experiences, or education, it depends, of course, on what one is assessing. If a program has an academic orientation, then a test in certain classical areas of education would be appropriate. But most apprenticeship-type programs probably would not have academics as a major

orientation. They would no doubt be more concerned with developing effective workers than knowledgeable scholars. To date, there seem to be no multi-phasic criterion-referenced tests to measure the effectiveness of educational R&D workers. This may well be due to the fact that the criteria have not been fully explicated. Until that time then, the use of objective measures to assess the degree to which educational R&D workers are effective workers seems unfeasible. In the meantime there will need to be the traditional reliance on opinion, productivity, the satisfaction of critical incidents and the like, all of which are likely to be situation-specific and involve personalities. The state of the art has simply not progressed to the stage where more objective alternatives are available.

K. *Who applied? What were their characteristics?*

The following tables summarize the information on selected characteristics for both the Seattle and Bay Area pools of applicants, plus a total for both pools combined. In some cases, the n's may not total the number of applications received, due to omitted information.

Age

Range	Seattle	Bay Area	Total
25-29	11	3	14
30-34	7	9	16
35-39	19	13	32
40-44	14	13	27
45-49	18	14	32
50-54	21	7	28
55-59	9	9	18
60-64	3	4	7
?		1	1
$\bar{x}$	43.5	43.9	43.6

The average applicant might be described as "middle-aged." It was somewhat surprising that the group was as mature as it was. Originally, it was thought that younger, less experienced aerospace personnel would be more likely to receive the impact of cutbacks and thus would have disproportionate representation in the applicant group. As a general observation about the group as a whole, a surprising number of persons seem willing to transfer careers at a point which is past the middle of their working lives. This statement may, of course, be tempered by the urgency of their situations. It could well be that another target group, which did not totally consist of the unemployed and was not solely from aerospace, would have quite a different configuration.

Sex

	Seattle	Bay Area	Total
Male	96	70	166
Female	6	3	9

The number of female applicants was considered to be quite small, since every effort was made to encourage this group. However, as discussed in Section F, these numbers may bear some relationship to male-female differences in the general population of unemployed aerospace personnel. There is some evidence that an extremely high percentage of this population is male. Therefore, while this number of females appears low, it may in fact be more than reasonable, given the pool. Obviously, this configuration would be quite different, too, if the target population had been, say, unemployed teachers in California. Therefore, while substantial female representation was highly sought, there simply may not have been that representation in the target pool, given the criteria.

Years of School Past B.S. or B.A.

Years	Seattle	Bay Area	Total
0	62.7%	38.9%	52.9%
Up to 1 yr.	22.5%	11.1%	17.8%
Up to 2 yrs.	12.7%	29.2%	19.5%
Up to 3 yrs.	1.0%	11.1%	5.2%
Up to 4+ yrs.	1.0%	9.7%	4.6%

While almost half of the total group had done some graduate work, the Bay Area group accounted for a greater portion than did the Seattle group. When long-term graduate efforts are inspected (i.e., up to 3 years or up to 4+ years), the Bay Area group had approximately ten times the representation of the Seattle group. In part, this no doubt reflects the strong academic environment of the Bay Area, and particularly of the San Francisco peninsula. But even considering both groups as a whole, the applicants represented quite a well educated portion of the general public.

Graduate Degrees Earned

Degree	Seattle	Bay Area	Total
M.A./M.S.	9.8%	27.8%	17.2%
M.B.A.	2.0%	9.7%	5.2%
Ph.D.	1.0%	11.1%	5.2%
Totals: Any grad. degree	12.7%	48.6%	27.6%

Half again as many of the Seattle group as the Bay Area group had some graduate study. But about four times as many of the Bay Area group had actually completed the requirements for and received a graduate degree of some type. There were about three times as many M.A. or M.S. recipients, 4 to 5 times as many M.B.A.'s, and over ten times as many Ph.D.'s who applied from the Bay Area. Again, the Bay Area group of applicants appeared to be more academically high-powered than did the Seattle group. Much of this no doubt has to do with the graduate degree demands in the respective labor markets.

Last Salary (in Aerospace Industry)

Range	Seattle	Bay Area	Total
$ 6,000 - $ 7,999	4.0%	2.8%	3.5%
$ 8,000 - $ 9,999	10.0%	12.7%	11.1%
$10,000 - $11,999	16.0%	12.7%	14.6%
$12,000 - $13,999	20.0%	31.0%	24.6%
$14,000 - $15,999	24.0%	16.9%	21.1%
$16,000 - $17,999	12.0%	14.1%	12.9%
$18.000+	14.0%	9.9%	12.3%
$\bar{x}$	$14,386	$14,544	$14,451

Acceptable Salary (in Educational Research and Development)

Range	Seattle	Bay Area	Total
Open	14.3%	29.0%	20.4%
$ 6,000 - $ 7,999	6.1%	2.9%	4.8%
$ 8,000 - $ 9,999	27.6%	15.9%	22.8%
$10,000 - $11,999	25.5%	29.0%	26.9%
$12,000 - $13,999	19.4%	14.5%	17.4%
$14,000 - $15,999	5.1%	8.7%	6.6%
$16,000 - $17,999	1.0%	-	.6%
$18,000+	1.0%	-	.6%

Interestingly enough, the salaries represented in the two areas are relatively comparable. The fact that the Bay Area group was a better educated group did not seem to make much difference when it came to money.

In general, the applicants represented a group which had enjoyed reasonably comfortable salaries. The average salary during aerospace employment was $14,451: about half the group had salaries exceeding $14,000 a year. However, as indicated, they were willing to earn considerably less as starting salaries in educational research and development: less than 8% of the total group expressed a figure of $14,000 or above as an acceptable level.

It is difficult to tell how much of this was genuine and how much was prompted by statements in the Fact Booklet originally forwarded with the applications.

One section of the booklet dealt with reasonable salary expectation should an applicant enter the field of educational R&D. Those figures ranged from $8,000 to $12,000, with a somewhat higher range for special skill areas. Many applicants may, of course, have recorded what they deemed would be "acceptable" in the eyes of those reviewing the applications.

Months of Unemployment

Months	Seattle	Bay Area	Total
0- 4	22.8%	38.4%	29.3%
5- 9	35.6%	16.4%	27.6%
10-14	10.9%	23.3%	16.1%
15-19	20.8%	12.3%	17.2%
20-24	7.9%	5.5%	6.9%
25-29	2.0%	2.7%	2.3%
30+	-	1.4%	.6%

Prior to seeing these figures, it might have been hypothesized that since the Seattle unemployment situation was more severe than that of the Bay Area, there would be a much higher proportion of long-term unemployment in the Seattle group. However, this difference was not quite as extreme as would be imagined. About 31% of the Seattle group versus 22% of the Bay Area group had been out of work for fifteen months or longer. In fact, a small proportion of the Bay Area group had been unemployed for an astoundingly long 2½ years or more. No doubt these situations provide strong impetus for seeking work in other areas, perhaps in any area, and accepting salaries which are lower than those to which they had been accustomed.

L. *What were reasons for applicant rejection?*

Appropriateness of initial criteria

The original criteria on which applications were rated included evidence of interest in education, existence of specific personal career objectives within the field of education, reasonable salary expectations, evidence of success in college, and evidence of success in employment. Of these, the one which was least easily applied was "existence of specific personal career objectives within the field of education." Candidates were judged as to what appeared to be strong commitment and interest in education and the extent to which they could offer general topical objectives, but to assess specific objectives was not reasonable. Most applicants were not in a knowledge position to be very specific and, perhaps, chose not to express much specificity for fear of limiting their opportunities in the training program.

Additional criteria

There were additional criteria which were or became part of the system. One of these was owning a B.S. or B.A. degree. A number of persons applied without the degree, in spite of this specific citation in the newspaper advertisement and Employment Service postings, on the argument that they had an equivalent amount of training. The decision was to hold to the original requirements, "as advertised."

Another unexpected criterion became that of "appropriate" qualifications, in the sense that some applicants were deemed almost over-qualified and did not "need" the program. As an example, one applicant had been heavily involved in education in his last job, had been vice president of a major private research house, held a Ph.D., and his last salary was $35,000 per year. To bring him to AIR, at $75 a week, to be cross-trained for three months as an educational researcher, seemed extraordinary and inappropriate to us, given the original objectives of the program.

It is now apparent that programs of this sort need to consider the possibility of "maximum qualifications" as well as the more obvious "minimum qualifications." Perhaps the basic guiding thought when this issue arose in this program was that it was a program designed for persons who were interested in educational R&D, but who did not already possess the natural entry keys. It was a program designed to provide opportunities to persons with basic credentials, who might not otherwise have had those opportunities, to enter educational research and development. Individuals with Ph.D.'s in any field or individuals who had already been heavily involved in educational R&D seemed suspect. The general thinking was that these persons ought to be able to obtain entry into the field without the program. We also had the rather common thoughts that persons who had been super high-powered

in their former positions would somehow be dissatisfied with the junior positions likely to result from the program, and that this disparity would lead to dissatisfaction, frustration, and perhaps, short job tenure.

From the viewpoint of the unemployed, this agrument has often been heard and just as often criticized. These are, perhaps, judgments which reviewers of applications should not make. If the applicant is willing, then perhaps he should be given the opportunity. These diverse views are obviously not easily resolved. Reasons for rejection depend on why the particular applicant audience was targeted, and no general statements can be made. Suffice to say that upper limits as well as lower limits need to be considered. Whatever those limits are depends on the reasons for tapping that particular population in the first place.

Additional reasons for applicant rejection

Other reasons for applicant rejection by the judges included clear non-association with aerospace, already employed, very little reference to education, consistent and persistent job-jumper, no degree, extraordinary salary expectations, and poor academic or employment record.

While this pool no doubt included a number of persons who would have made substantial contribution to the program, and smooth adaptation to educational R&D, the decision was made to hold to the advertised requirements, out of fairness to all. This turned out to be the wisest course of action. While a number of the unqualified seemed otherwise very attractive, constantly making individual exceptions can lead to very muddy waters, indeed. A program needs to define its basic selection criteria at the very beginning, and faithfully adhere to those criteria.

M. *In addition to how might trainees be selected, who might be selected in future replications of the model?*

The notion of cross-training in this model is basically sound. The program certainly worked to a more than reasonable degree, and the manpower pool seemed strongly responsive to a program of this type. But there are some serious considerations as to whether or not the pool needed to have the basic characteristic of being unemployed. It is felt that this single characteristic contributed to a great deal more real and imagined "static" than might otherwise have been the case.

It is important to note that selection for the program depended, in part, on genuine motivation to join the program. A program wants trainees who are maximally interested in educational R&D work and who are thus more likely to have maximum success. The factor of being unemployed raises obvious questions of doubt as to whether the decision to pursue program membership was sincerely based in interest or whether it was based in just pursuing another channel to find some opportunity, in some field, just for the sake of potential employment. The model itself has no relationship to this question, nor did the criterion of being a physical scientist or aerospace worker have anything to do with this question. It is totally related to that one selection factor of unemployment.

There are, of course, program purposes and philosophies which would call for far less concern with this issue of genuine interest. This would be the case for programs which were initiated because of social or economic conscience. However, if the issues are ease and speed of transition into educational R&D, new and fresh ideas into educational R&D, or confidence of interest in educational R&D, then the factor of unemployment becomes much more a point of confusion than substantive confirmation. Responsiveness in this case had to be tempered by the audience.

Cross-training or retraining programs for unemployed aerospace workers, in any variety of areas, were very popular during 1971. Some were effective, many were not. The big unknown is whether or not participants were in the programs willingly and enthusiastically, or only because they were areas to which to turn in times of severe employment stress. This can never be genuinely answered.

It may well be that future programs conducted for the benefit of strengthening the area of educational R&D might well select from an audience who is gravitating toward education for more natural reasons. This is not to necessarily doubt those who entered this program under the specified conditions, but the degree of confidence in genuine interest and commitment to the field would have been enhanced had the target population been something other than the relatively long-term unemployed. In summary, unemployment was felt to be a strong and, perhaps, unnecessary, intervening variable; and future programs might be targeted for more obvious audiences, no matter what model is employed.

CHAPTER 4

WHAT OTHER TYPES OF MODELS OR MODIFICATIONS OF THIS MODEL MIGHT BE CONSIDERED?

During the course of the program, varieties of models for the development of educational research and development personnel were discussed and considered. These models fell into three broad categories: (1) the Independent Training Model, (2) the "Adjunct" Model, and (3) the In-Service Model. Each will be discussed in turn in the following paragraphs.

The Independent Training Model

In the training model, there are two key variables, the audience being trained and the target level of the intended employment positions. Common to all of the audiences is that they are new to educational R&D and have had no special or formal contact with education. There are, of course, other variables which could also be considered, such as intensity of training effort and the length of the training program, but in terms of explaining the model, it will be assumed that these particular variables are held relatively constant across audiences in combination with intended sophistication of outcome.

Firstly, there are many potential audiences for training, but three examples would adequately describe the major categories. The aerospace trainees of the present project reflect the highest degree of technical sophistication which trainees would normally be expected to bring to the training setting. These trainees were already highly educated, experienced workers who had had some involvement with research and development, but in a different field. Trainees of this type could include professionals from any number of occupational areas, not directly associated with educational R&D. Examples are sociologists, economists, demographers, advertising personnel, political scientists, teachers, writers, and, of course, physical scientists of numerous types. The main goal of training programs for such types of trainees would be to reapply that expertise to the problems and processes of educational research and development, i.e., to cross-train. The ultimate goal of placement would be breadth of experience and fairly rapid advancement to key positions.

The second category of potential trainees are those who have collegiate education, but little work history, and almost no past contacts with educational R&D. An example would be the new college graduate with a B.A. in history. The ultimate employment level is likely to be that of the professional after some years of experience in educational R&D. But the

immediate targeted level of employment after a comparatively short training program would be that of an entry level position.

The third group could be labeled "non-professional." These would include secretaries who are moving into research assistant positions or experienced teacher aides, housewives, etc. Here, the targeted levels of employment are likely to be of a paraprofessional entry level position.

A training program for any of these three categories of the population is intended to be experiential, not exclusively academic. The issue would be to provide an orientation and realistic work experiences in educational R&D for persons who have had none and are not likely to have it otherwise. Obviously, training can be directed for many audiences and toward a variety of work outcomes, ranging all the way from entry level, clerk-type positions to key professionals. Which combination of factors a program wishes to emphasize in the training model depends on personnel needs in educational R&D, the desire for "new blood" in educational R&D, and even political, economic, and social realities. The training model of this study considered all three: there are predicted needs for experienced professionals, there is an acknowledged desire for expanded areas of expertise, and unemployed aerospace workers were a national problem which needed efforts at resolution.

The employment of a training model can thus be focused in a variety of directions depending on intent and philosophy. In some cases, there may be a desire to accelerate the opportunities for the bright and new-to-the-work-world who have expressed interest in educational R&D. In other instances, programs may have a more altruistic purpose, such as assisting in employment opportunities for minority groups, whose opportunities have been stifled in the past. Some basic philosophical differences may arise here. At odds could be the question of whether a program is initiated to help society or help educational research and development. Hopefully, both goals might be met in the same program. However, whatever the intent or philosophy of a program, it will be reflected in the criteria for trainee selection and in the potential employment positions of the trainees. In any case, the apprenticeship training model is flexible, for it could work across all settings and audiences, within limits. One key qualifier is that the training setting needs to be equipped to provide a variety of work experiences. The second qualifier is that the training program not be seen as a school, in the academic sense. No work-oriented institution is prepared to meet academic needs. Training in this model needs to be offered in light of who is being trained, what they are being trained for, and why they were selected for training in the first place.

There are some basic weaknesses in this model. First, it could be somewhat difficult for the host institution to provide all of the preliminary knowledges, work habits, and basic background in education desirable of even entry level personnel. There is neither the time nor the staff to offer such personalized assistance in areas which are somewhat peripheral to actual productivity in educational research and development. This po-

tential problem, of course, would diminish as the sophistication and experience of the trainee grew. It could certainly be the case that a host institution would want to take on the total, basic training of a totally inexperienced worker, but a training program of that type is more likely to focus on a philosophy of altruism than making practical and immediate inputs to the field of educational R&D. Thus, the training model is probably most easily employed when a minimum of guidance is to be offered each trainee. In addition it is clearly a training model, not a broad scope, multi-purpose educational program.

In summary, the training model is flexible and can meet a variety of needs relevant to educational R&D. However, such a model needs strong definition as to population and intent and, in addition, needs some degree of confidence that training will, in fact, result in a reasonable number of satisfactory placements.

The Adjunct Model

An alternative to the training model has been labeled the "Adjunct Model"--adjunct in the sense that it is conducted in a parallel fashion with a formal study program at some university or college. This model would probably be somewhat more comfortable for the host institution in that there is not the same degree of sensed responsibility for the trainee's future as there is in the independently run training model. In addition, the student would spend a portion of his time in traditional classwork and study in an academic institution and a portion of his time in a real-life work setting. Such arrangements have been labeled work-study programs, and more recent versions have been labeled "engineered internships." In the latter case, the student would theoretically spend a portion of his day or week in formal study and the remainder of his day or week in real-life application of that study.

This would be a highly desirable arrangement, and its concept seems to be growing in popularity. However, in most instances, engineered internships are not realistic. Firstly, in basic philosophy, they are modeled on the old notion of "teacher training": the student teacher is placed in a real school under the sponsorship of a classroom teacher, but his ultimate evaluation still lies with the institution or professors at the university, college, or whatever. In this sense, the academic institution attempts to supervise, monitor, and evaluate the activities in the work setting. This is simply not a very practical approach. The organization providing the work experience cannot tailor make its activities for the benefit of the student or for what the student's academic institution perceives as his benefit. Work-study arrangements cannot be organized around the student unless the work is manifestly artificial or unless the university is extremely flexible in the way it accumulates student "credit." Ordinarily the students' activities need to revolve around those of the institution. The student needs to mold himself to the ebb or flow of the work of the organization: otherwise the work experience is not genuine.

In addition, faculty members representing the academic institution and supervising the student frequently cannot define what are deemed worthwhile student activities in the various organizations providing the work experience. Such an attempt would no doubt be met with great resistance and a mild furor. It is not conceivable that a faculty member visit such organizations as AIR, ETS, or the Far West Lab and try to prescribe the activities of the student. In the first place, it would be an intrusion; and in the second place, what the instructor thinks that students need might not be available at that time, or ever, in the organization. If it is not a natural and common activity, the organization would hardly be equipped to offer it.

There are, perhaps, two conditions under which the "Adjunct Model," characterized by the engineered internship, might be workable. The first of these would be if the work portion were somewhat removed from the study portion, without an overly studied attempt to match work with academics. This would be typical of the highly successful and well established work-study program at Antioch. The organizations are expected to provide work, but not study, experiences. The student is expected to accomodate to the ebb and flow of whatever work he is in during the work portion of the program. The workday follows the pattern of a normal workday for a number of weeks or months. There is not the interrupted workday while students go back to class, so typical of other work-study programs. In this situation, a more real-work life experience is likely to be had, and the opportunity for more substantial contributions on the part of the student is likely to be enhanced.

What is characteristic here is that the academic institution is willing to give up control of the student for intermittent periods while, at the same time, having confidence that the organization where the student is placed is, in fact, offering the student a valuable work experience. From the viewpoint of the organization, the student's presence places no great load on either staff time or the normal flow of production. It is an easy arrangement from both sides.

Even if an academic institution is unwilling to give up control of the student or to place a degree of confidence in the organization sponsoring the work, there is still one other set of conditions which could make the Adjunct Model practical; although economically, they are not likely. That would be if the academic institution were, in some way, willing to underwrite the activities of its students. If it is somehow expected that the work organizations will offer academic study or will tailor make its activities for the benefit of the student, then some compensation to the organization needs to be offered. To offer academics, which is unnatural to the organization, or to provide specialized experiences, which is uncommon to the organization, would result in extraordinary direct and indirect expenditures. Organizations might be willing to fulfill these expectations, but to do so without some sort of external underwriting is not reasonable.

Therefore, while the adjunct model sounds like a good idea, it is difficult to carry off without some very special and mutually understood conditions. In

most cases, this model as it is currently approached, is not particularly attractive to potential host institutions.

The In-Service Model

The third model is labeled the "In-Service Model," and it is by far the most practical; and in terms of today's employment patterns in educational R&D, perhaps the most important of the three discussed.

It is practical in the sense that there is little intrusion on the organization. Trainees are easily selected and bring to the training situation some commitment to, and experience in, educational R&D, and presumably strong potential for expanded contribution to the field. The institutional focus for that contribution is already defined.

The emphasis in the model would not be basic training, as in the other two models, but rather provision for expanded growth in the field of educational R&D based on a foundation of already acquired basic skills and experience.

Trainees would be drawn from a wide variety of agencies, organizations, and institutions already involved, either directly or indirectly, in educational R&D. These would include profit or non-profit agencies, the various educational centers and laboratories, public school systems, federal and state departments of education, and the like. Personnel from these various settings could range all the way from paraprofessionals to senior professors. Independent institutions are perhaps more accountability oriented than subsidized institutions engaged in educational R&D. There is much to be learned from environments of the former in their sense of urgency and mission, their need for competitive creativity, and the general necessity for the management of products and personnel in a businesslike setting.

The basic manpower problem in educational R&D today is not how to get more persons into the field, but how to upgrade the personnel we already have. There need to be provisions for providing the strongest possible experiences, and a variety of experiences, to as many of the existing personnel in the field as possible. Such a provision could allow for the strengthening of the field as a whole. These are times, perhaps, when we do not need "more bodies," but "better bodies." We need to capitalize on the partially developed expertise which is already there, and an In-Service Training Program seems the most fruitful direction.

This will become progressively even more important given the initiation and development of the National Institute for Education. The design for NIE calls for a great deal of eventual in-house activity. NIE is going to make tremendous demands on experienced manpower, particularly in the areas of planning, research, and evaluation. A substantial portion of this demand might be met through an effective In-Service Training Program.

As in any training model, there is still the problem of crediting or certification. However, there are new movements which might be used to overcome this traditional problem. Programs of the In-Service type might begin to tie into the newly emerging "University Without Walls," and external degree programs such as are being developed in New Jersey, New York, Minnesota, and California.

It would be highly appropriate for the field of educational R&D to further explore in-service training and crediting programs of this type. Current possibilities in this general direction are offered by the programs at the Minnesota Metropolitan State College where "graduation" is based on certified competency; and in the traditionally conservative New York State Board of Regents, Edison College is an exclusively external study college being developed in cooperation with the Carnegie Foundation in the state of New Jersey.

With some attempts at organization, contacts, and development, there is no reason why In-Service Programs sponsored by private institutions could not offer certification through these emerging advanced study structures.

It is an exciting idea and could offer a more potent influx of experienced, productive workers to the field of educational research and development than has ever before been realized.

APPENDIX A

TRAINEE SURVEY

As part of our final studies of the training program, we are interested in your responses to the following questions. Your comments may by typed or written; it is not necessary that you identify yourself. Please give your comments to Jim, Gene, or Judy by late Tuesday afternoon, or early Wednesday morning, at the latest. Thank you for your help.

1) To what extent do you feel you know more about educational R&D in general, than you did thirteen weeks ago?

2) In which specific topic areas did you gain the most information from the program?

3) What specific skills related to educational activities were additionally or solely developed because of your participation in the program?

4) To what extent did you pursue outside, independent study on topics of interest, topics related to apprenticeships, or topics which you thought would be useful in educational R&D?

5) Which components of the program seemed to be most useful in your acquisition of information and/or skills, i.e., seminars, independent readings and contacts, informal discussions, apprenticeship activities, and so forth?

6) Would you have desired more or less structure in terms of readings, formal seminars, or other types of directed study?

7) Would you have desired more mandatory activities, deadlines, etc.?

8) Do you feel you could or should have started on apprenticeships the first few days of the program?

9) How would you compare the effectiveness of a) one or two long term apprenticeships versus b) a series of short term apprenticeship experiences?

10) What recommendations would you make for future programs?

11) To what extent do you feel you are more prepared to enter the field of educational R&D now, than you were thirteen weeks ago?

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